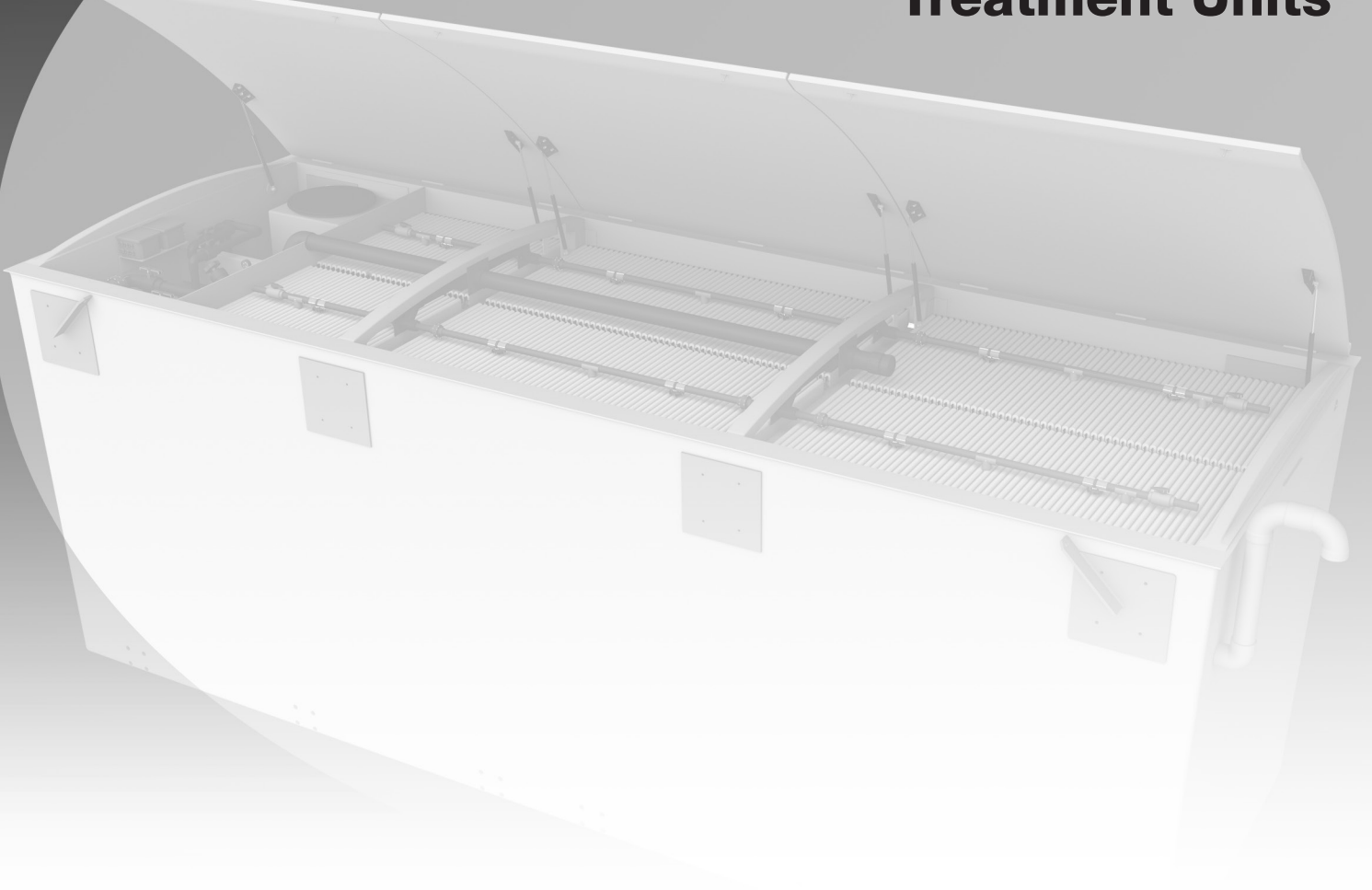


# Installation Manual

## AdvanTex® AX-Max™ Treatment Units



**Orenco**<sup>®</sup>  
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**How to Use This Manual**

This manual contains an Installation Overview and a set of Installation Steps.

- **Installation Overview** — This is a simple overview of the installation steps. It is a reference only; complete instructions are found in the installation steps that follow.
- **Installation Steps** — These provide general instructions for each installation step, along with references to installation documents for specific components. Many Orenco products come with installation instructions. All of these instructions are also provided in hard-copy form in our Orenco Installer Binder. Contact your dealer or Orenco for a copy of the binder, or find individual instructions online in the Orenco Document Library at [www.orenco.com](http://www.orenco.com).

You will find *IMPORTANT information*, *Key Points*, and *Notes* in this manual, marked with easy-to-see visuals:



**IMPORTANT** — These point out potential hazards to equipment or people during and after the installation.



**Key Points** — These are critical for a quality installation and are necessary for your installation to be successful.



**Notes** — These cover useful information and tips that can help make your installation simpler or easier. They may also provide information on variations in components or methods.

**All product and performance assertions are based on proper design, installation, operation, and maintenance according to Orenco’s current published documentation.**

## Before You Begin

Before you begin the installation, read this manual and any documents referenced in it. Also, be sure that the instructions for these products are the most current ones available. Please note that **you must perform the installation according to the current manual or the AdvanTex Treatment Systems Limited Warranty will be void.** You can make sure your instructions are current by checking our online Document Library at [www.orenco.com](http://www.orenco.com). You'll save time and money on installation day, and you'll get fewer call-backs.

This manual provides basic information for installing AdvanTex AX-Max treatment units in-ground. These instructions do not replace training or engineering plans.

Before beginning the installation, schedule a pre-construction meeting with the project engineer, electrician, operator, inspector/regulator, and your Orenco representative. Any inconsistencies in the plans, specifications, or regulatory issues identified during the pre-construction meeting should be completely addressed prior to installation. If there are differences between your engineering plans and the instructions in this manual, contact your project engineer.



### IMPORTANT

- **DO NOT** plumb the backwash discharge from a salt-type water softener into an AX-Max unit or preceding primary treatment tankage.
- Failure to follow the instructions in this manual will void the system's warranty.
- Take necessary precautions to avoid falling into the AX-Max units.
- Properly secure all access lids after the work is complete.



### Key Points

- Inspect your order for completeness and inspect each component for shipping damage. If any part of the order is incomplete or damaged, contact your dealer or Orenco.
- Contact your engineer if you have questions about your installation.
- All tankage, components, and plumbing used in conjunction with an AX-Max treatment unit must be installed properly according to their manufacturer's instructions.
- All tankage, components, and plumbing used in conjunction with the installation of an AX-Max treatment unit must be watertight.
- Make sure these instructions and the items supplied comply with your state and local regulations.
- If you are not an authorized AdvanTex Installer, contact your local dealer for training and authorization before installing this system.
- Improper installation may cause difficulties in system performance, operation, and maintenance issues.



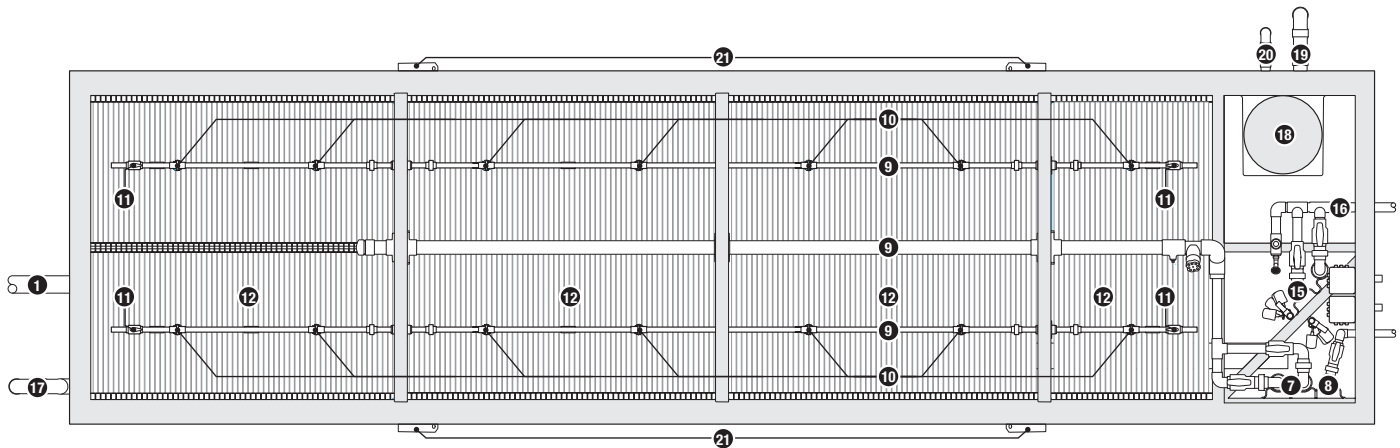
**Note** All pipe diameters provided are US nominal IPS pipe sizes. If you are using metric pipe, you may need adapters to connect to the US fittings supplied with AdvanTex Treatment Systems.

**Standard Unit Components**

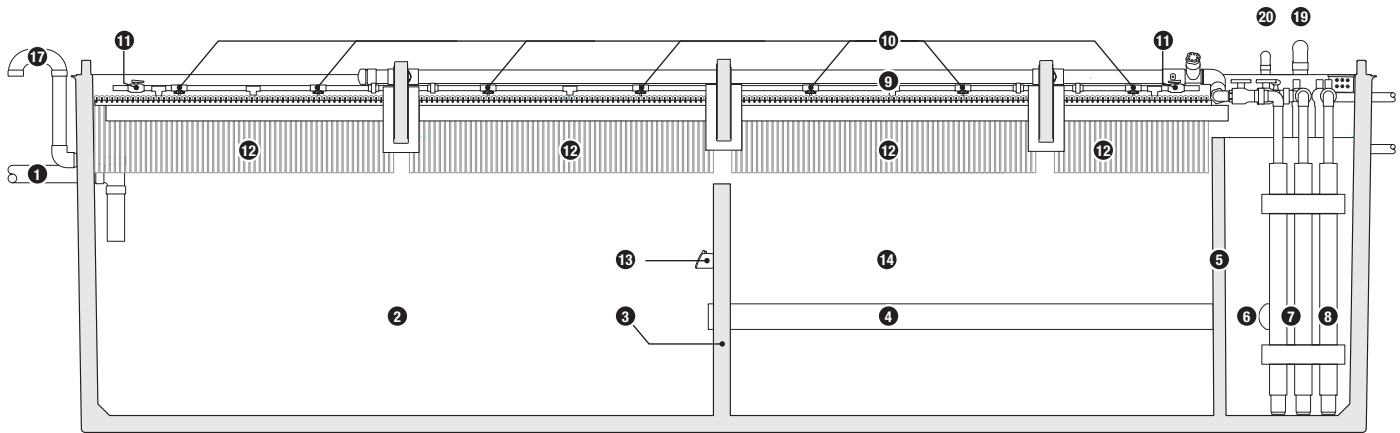
**Example AdvanTex AX-Max Treatment Unit**

AX-Max units are highly customizable. The configuration and components shown in this diagram are not intended to match the specific units used in your installation.

- |                              |                                      |                               |
|------------------------------|--------------------------------------|-------------------------------|
| 1 AX-Max inlet               | 8 Pre-anoxic return pumping assembly | 15 Discharge pumping assembly |
| 2 Recirc-blend chamber       | 9 Distribution manifold              | 16 Discharge outlet           |
| 3 Tank baffle                | 10 Spray nozzles                     | 17 Vent inlet                 |
| 4 Recirc-transfer line       | 11 Lateral ball valves               | 18 Vent fan assembly          |
| 5 Recirc-pump chamber baffle | 12 AdvanTex textile media            | 19 Vent outlet                |
| 6 Recirc-pump chamber        | 13 Recirc-return valve               | 20 Vent motor air exchange    |
| 7 Recirc pumping assembly    | 14 Recirc-filtrate chamber           | 21 Lifting bracket            |



Example AX-Max Treatment Unit (top view, without lids)



Example AX-Max Treatment Unit (side cutaway view, without lids)

## Installation Overview

- Step 1.** Review and compare the plan set to the actual site.
- Step 2.** Perform the excavation(s) for the AX-Max unit(s) to the depths shown on the plan set.
- Step 3.** Prepare the pads for the AX-Max unit(s).
- Step 4.** Set the AX-Max unit(s) into position.
- Step 5.** Place anti buoyancy measures on the AX-Max unit(s), if necessary.
- Step 6.** Plumb, test watertightness, and backfill the unit(s) in stages until you reach the grade specified on the plan set.
- Step 7.** Mount the control panel, route conduit and wiring, and connect the panel's inputs and outputs.
- Step 8.** Prep the AX-Max unit(s) for start-up.

## Installation Steps

### Step 1. Review and Compare Plan Set

Review the plan set and compare it with the actual physical site.

- Make sure there are no obstructions on the site that could interfere with the installation.
- Check that all locations and elevations match the plan set.
- Discuss any differences between the plan set, the site, and these instructions with the engineer before continuing.



#### Key Points

- Follow the plan set for specific spacing distances between AX-Max units, as well as between AX-Max units and other buried components. Contact your dealer for more information.
- See Table 1 for depth and spacing recommendations.
- For reasonable service access, Orenco strongly recommends 24-36in (610-914mm) clearance between final grade and the underside of the unit's lid. See your plan set for specific burial or berming depths.
- If the transport line from primary tankage or the sewer inlet uses gravity discharge, maintain a minimum slope of 1/8in per foot (10mm per meter or 1%) in the transport piping from the primary tankage.

### Step 2. Perform Excavations



**Note** For units installed above grade and then bermed, skip this step and go to Step 3.

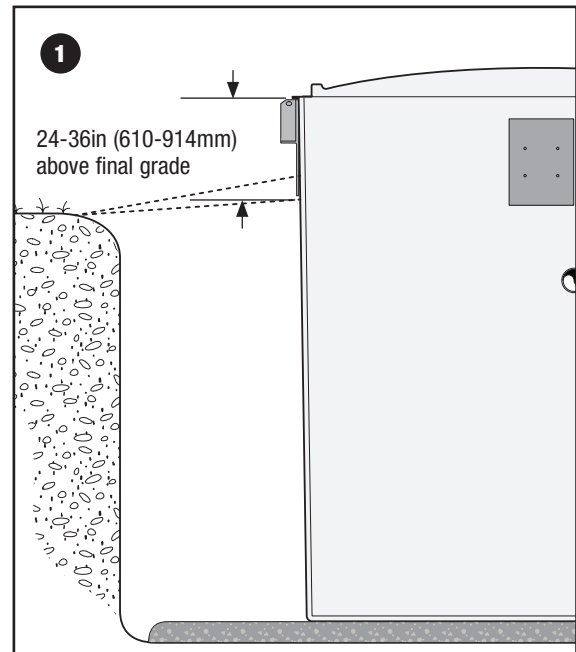
Perform the excavations required for the AX-Max unit(s).

- Mark the site(s) for the unit(s) and plumbing runs.
- Make the excavation(s) to the depth listed in the plans.
- If necessary, install shoring. Consult the engineer and applicable regulations for shoring requirements.
- If specified, excavate and prep French drains or other drainage systems.

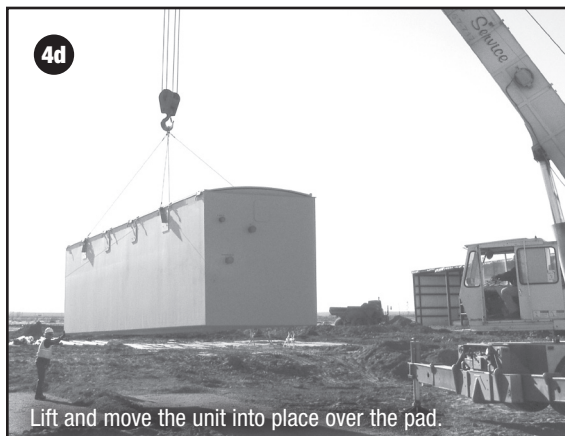
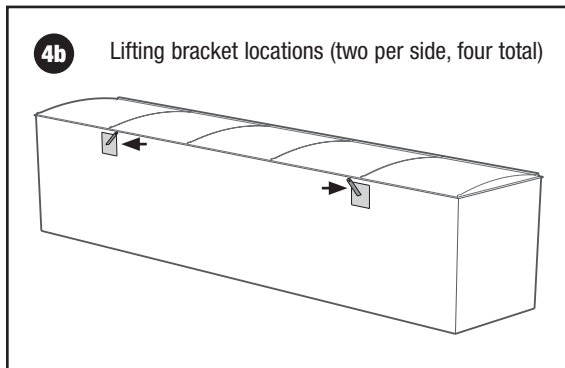
**Table 1. Recommended Spacing for Units Equipped with Anti buoyancy Measures**

Burial Depth,* ft (mm)	Required Spacing, ft (mm)
5.5 (1680)	8 (2440)
6.5 (1980)	10 (3050)
7.5 (2290)	12 (3660)

\*Burial depths are measured from the bottom of the unit.



**Installation Steps**



**Step 3. Prepare AX-Max Unit Pad(s)**

**Step 3a:** Make sure the bottom of the excavation or the pad site for each AX-Max unit is level and free of debris, rocks, and sharp objects.

- The base has to be stable and uniform to ensure equal bearing across the tank bottom.

**Step 3b:** Lay a level, compacted bedding of  $\leq \frac{3}{4}$ in (19mm) aggregate, pea gravel, or approved granule overlying a firm, uniform base.

- Compact the bed to 95% compaction.
- Lay the pad at least 7.5ft (2.3m) wide and at least as long as the unit.



**Key Points**

- Completely level pads are critical for correct installation.
- If the base soil is unstable (peat, quicksand, muck, soft or highly expansive clay, etc.), overexcavate the site depth and set a firm, 6in (150mm) compacted pad of  $\leq \frac{1}{2}$ in to  $\leq \frac{3}{4}$ in (13 to 19mm) aggregate.
- For installing in-ground units in extremely unstable soil, a concrete pad may be required to stabilize the bottom of the excavation. Contact the engineer with questions about soil stability.

**Step 4. Set AX-Max Unit(s)**



**IMPORTANT**

- ALWAYS bolt the lids before lifting, moving, or backfilling the AX-Max unit!
- Know the weight of the specific unit and use the proper lifting equipment.
- AX-Max units vary in weight up to more than 12,000lbs (5443kg). If you are unsure of the unit's weight, contact Orenco before attempting to lift it.



**Key Point** When installing multiple units in the same system, confirm the location and direction of each unit before off-loading and placing it.

**Step 4a:** Position the transport vehicle and lifting equipment as close to the pad as possible.

**Step 4b:** Attach the provided lifting cables to the four lifting brackets on the unit and raise the lifting equipment until all of the cables are tight.



**IMPORTANT** Make sure the cables are properly attached!

**Step 4c:** If antilotation brackets are included with the unit, attach them to the unit's base with the supplied hardware.

**Step 4d:** Lift and move the AX-Max unit into position over the pad.



**IMPORTANT** Keep nonessential personnel clear when placing the AX-Max units!



## Installation Steps

### Step 4. Set AX-Max Unit(s), cont.

**Step 4e:** Lower the unit onto the pad, making sure that the unit is centered.



**Key Point** The underside of the unit's lid requires 24-30in (610-760mm) clearance above final grade.

### Step 5. Construct Antibuoyancy Measures (If Needed)



#### Key Points

- The standard method for constructing antibuoyancy measures is described below. For other methods, contact your dealer or Orenco.
- Contact the project engineer if you are unsure about the need for antibuoyancy measures.

**Step 5a:** Build forms 12in high × 20in wide (305mm × 508mm) along the full length of both long sides of the unit(s).

- The concrete has to cover the rebar by a minimum of 1.5in (40mm) after it is poured and level.

**Step 5b:** Place three evenly spaced #4 rebar runs on top of the antiflotation brackets, along the unit's entire length on both sides.

- Tack weld or wire-tie the rebar pieces in place on the brackets.

**Step 5c:** Pour concrete into the forms.

**Step 5d:** Wait for the concrete to set before backfilling.

### Step 6. Plumb and Backfill AX-Max Unit(s)



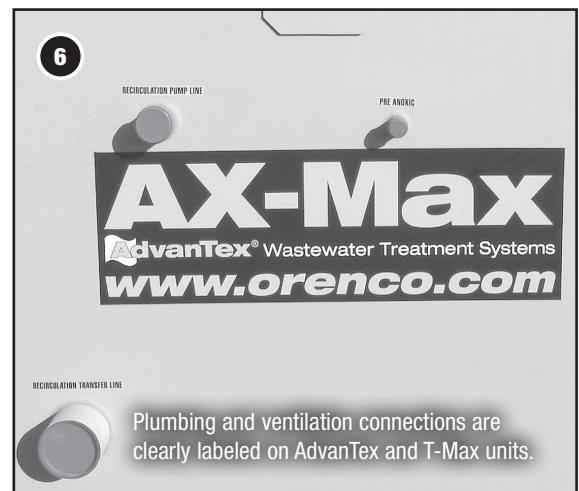
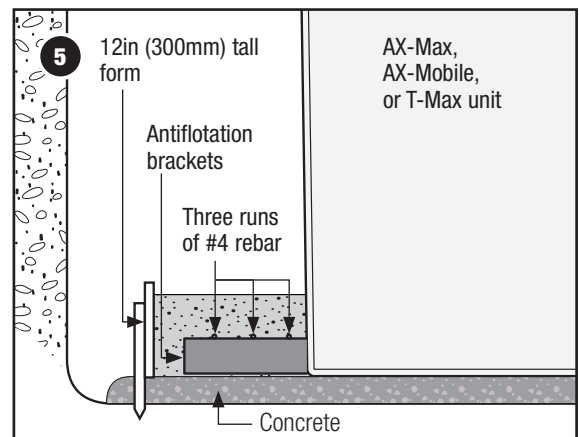
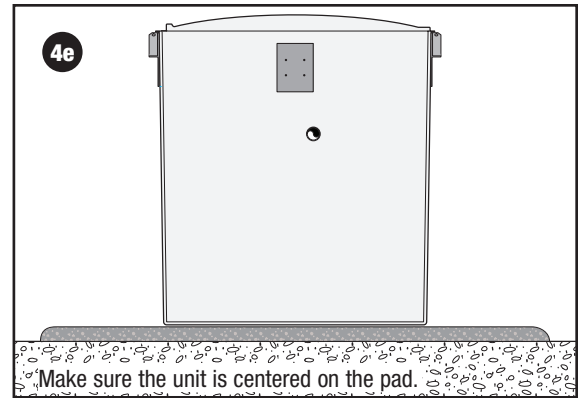
#### Key Points

- Keep all AX-Max lids bolted down during backfilling, unless you are filling the unit(s) with water.
- Only one lid on an AX-Max unit can be unbolted at any time during backfilling and adding water.

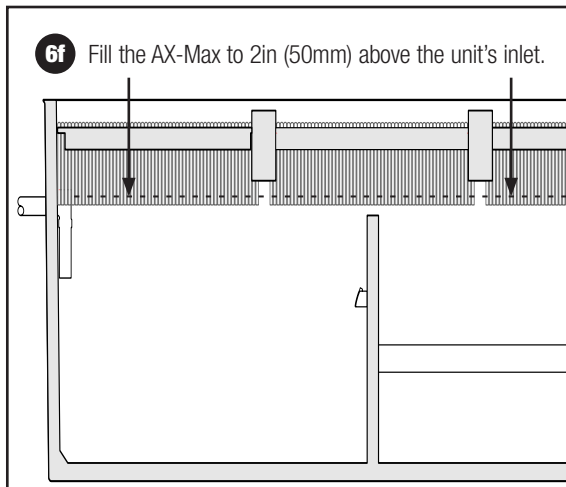
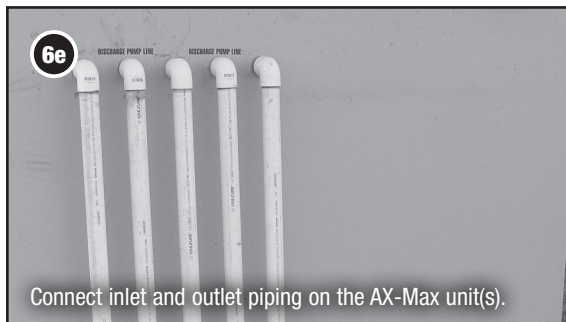
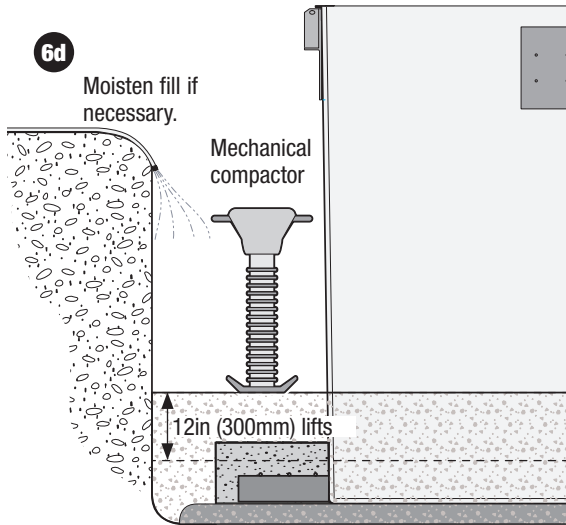
**Step 6a:** Use the plan set to identify the location of all transport lines and ventilation connections between the AX-Max unit(s) and other treatment components, tankage, sewer lines, and dispersal.

**Step 6b:** Connect any recirculation transfer, recirculation return, and filtrate transfer lines.

- Support the transport lines to prevent sagging.
- If there are no recirculation transfer, recirculation return, or filtrate transfer lines, go to Step 6e.



**Installation Steps**



**Step 6. Plumb and Backfill AX-Max Unit(s), cont.**

**Step 6c:** Fill each AX-Max unit with water to 6in (150mm) above the recirc transfer, recirc return, and filtrate transfer connections to test for watertightness.

- Wait 10 minutes and then check for leaks around the penetrations and lines, as well as for changes in the liquid level inside the AX-Max unit(s).
- Repair any leaks in the lines and connections.
- Contact Orenco for any leakage around plumbing penetrations in the AX-Max unit(s) or if the liquid level inside the unit(s) decreases.

**Step 6d:** Backfill around the AX-Max unit(s) to 2in (50mm) above the recirc transfer, recirc return, and filtrate transfer lines.

- Lay a level, 95% compacted bed of  $\leq 3/4$ in (19mm) aggregate, pea gravel, or approved granule for transfer lines.
- Backfill in 12in (300mm) lifts – don't damage the lines.
- Use a mechanical compactor to compact each lift.
- If necessary, moisten the backfill material with water to help compaction.

**Step 6e:** Connect the inlet and outlet piping to the AX-Max unit(s).

- Support the inlet and outlet piping to prevent sagging.

**Step 6f:** Fill each AX-Max unit with water to 2in (50mm) above the inlet to test for watertightness.



**IMPORTANT NEVER submerge electrical conduit penetrations or junction boxes inside an AX-Max unit!**

- Do not fill the unit more than 2in (50mm) above the inlet.
- Wait 10 minutes and then check for leaks around the penetrations and lines, as well as for changes in the liquid level inside the AX-Max unit(s).
- Repair any leaks in the lines and connections.
- Contact Orenco for any leakage around plumbing penetrations in the AX-max unit(s) or for changes in the liquid level inside the unit(s).

**Step 6g:** Backfill around the AX-Max unit(s) to the level listed on the plan set.

- Lay a level, 95% compacted bed of  $\leq 3/4$ in (19mm) aggregate, pea gravel, or approved granule for inlet and outlet piping.
- Backfill in 12in (300mm) lifts.
- Use a mechanical compactor to compact each lift.
- If necessary, moisten the backfill material with water to help compaction.



## Installation Steps

### Step 6. Plumb and Backfill AX-Max Unit(s), cont.



#### Key Points

- Don't alter the slope of lines or damage the lines during backfilling.
- The underside of the unit's lid requires 24-30in (610-762mm) clearance above final grade.
- Do not use native material to backfill if it is very soft or highly expansive clay or if it contains debris, large ( $>3/4$ in or 19mm) rocks, sharp rocks, peat, or muck. In these cases, use  $\leq 3/4$ in ( $\leq 19$ mm) crushed stone as fill material. This material should be washed and free of debris.
  - In noncohesive soils\* with high seasonal water tables, use  $3/4$ in crushed rock as the backfill material.
  - Do not backfill with sand.
- Be sure that the final grade slopes away from the unit(s).

\* As described in OSHA Standards (29 CFR, Part 1926, Subpart P, Appendix A), noncohesive soils or granular soils include gravel, sand, or silt with little or no clay content. Granular soil cannot be molded when moist and crumbles easily when dry. Cohesive soils include clayey silt, sandy clay, silty clay, clay, and organic clay. Cohesive soil does not crumble, can be excavated with vertical sideslopes, is hard to break up when dry, and when moist, can be rolled into threads without crumbling. For example, if at least a 2in (50mm) length of 1/8in (3mm) thread can be held on one end without tearing, the soil is cohesive.

### Step 7. Mount and Connect Control Panel



**Note** Installation instructions, schematics, and wiring diagrams that are specific to the panel and float switch configuration are included with each panel. If any of these is missing, contact your dealer for a replacement.

**Step 7a:** Mount the control panel using the instructions included with it.



**IMPORTANT** DO NOT mount the control panel on an exterior wall of a residential building or living space other than a garage or shop wall! The motor contactors make a sound while engaging and disengaging that can be disruptive to occupants.



#### Key Points

- Follow all applicable regulations for placement of the control panel.
- Mount the panel in a service-friendly location.
- Protect panels from direct sunlight, if possible, by installing them under protective coverings, mounted on weather-resistant material and supports.
  - Ultraviolet light can degrade the surface of the panel over time.
  - Constructing shade for the panel helps avoid excessive temperatures.

**Step 7b:** Route and install any necessary electrical conduit.

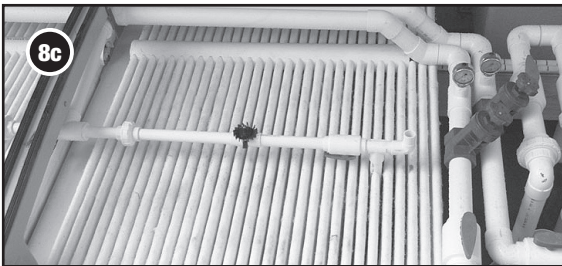
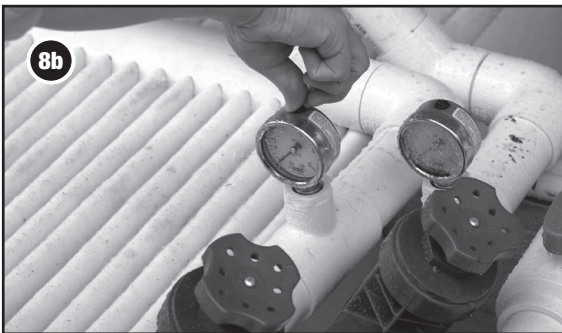
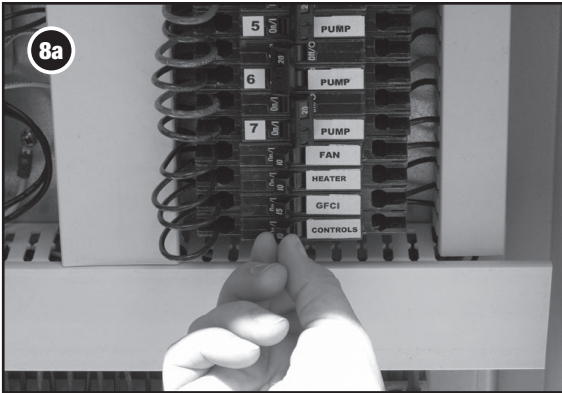


Control panel mounted on external wall.



Control panel mounted on backing panel and posts

**Installation Steps**



**Step 7. Mount and Connect Control Panel, cont.**

**Step 7c:** Route all system-related electrical and telecom wires into the control panel and make connections as shown in the system's wiring diagram.

- One or more incoming power circuits may be required for the control panel, depending upon the number of pumps and applicable codes.
- Phone, Ethernet, or cellular modem wiring is required for remote access (in TCOM remote telemetry panels).



**Key Points**

- This step should be performed by a licensed and qualified electrician.
- Follow all applicable regulations and electric codes.
- Use waterproof wire connectors to avoid electrical shorts and other issues.
- Be sure to seal the conduit at the control panel and at the splice box with UL-listed sealing foam, putty, silicone sealant, or an Orenco seal kit.

**Step 7d:** Connect electrical power to the control panel.

- This step should be performed by a licensed and qualified electrician.

**Step 8. Prep AX-Max Unit(s) for Start-Up**

Make sure that the AdvanTex unit(s) and all components are functioning properly.

- See AIM-OM-ATX-4, [AdvanTex O&M Manual, AX-Max and AX-Mobile Treatment Systems](#) for specific information covering the start-up of these treatment systems.



**IMPORTANT** Before testing pumps in AX-Max units, be sure the unit is filled with enough water to avoid damaging the pumps.

**Step 8a:** Switch the control panel circuit breakers to "ON."

- Check the wiring diagram in the control panel for circuit breaker locations.

**Step 8b:** Equalize the pressure on the pressure gauges in the AX-Max unit(s).

**Step 8c:** Flush the unit's laterals in the AX-Max unit(s).

- Turn the laterals to point the spray nozzle turbines up and away from the textile.
- Open the outlet valves on the ends of the laterals.
- Open the manifold valve.
- Toggle the recirc pump switches to "MAN."
- Allow the pumps to flush debris out of the pod's manifold and laterals.
- Toggle the recirc pump switches to "OFF."
- Close the outlet valves on the ends of the laterals.
- Turn all laterals so the spray nozzle turbines are pointed down.

## Installation Steps

### Step 8. Prep AX-Max Unit(s) for Start-Up, cont.

**Step 8d:** Check the nozzle spray patterns in the AX-Max unit(s).

- Toggle the recirc pump switches to “MAN.”
- Pressurize the manifold and laterals to 3.5psi (24.1kPa).
- Check the nozzles for square spray patterns onto the splash guards.
- Adjust the manifold pressure for good spray patterns, if needed.
- Toggle the switches to “OFF” when finished.

**Step 8e:** Make sure the following components are functional and operating properly in each AX-Max unit equipped with them:

- **Recirc float switches**

- Toggle the pump control switches to “AUTO.”
- Check the functioning of the recirc pump float switches by lifting the low-level, mid-level, and high-level switches in turn and verifying their signals in the control panel.

- **Discharge pump(s) (if applicable)**

If the unit is equipped with discharge pump(s), verify that the discharge pumps and float switches (if applicable) are operating correctly.

- **For pumps with timed-dose controls**

Toggle the discharge pump switches to “MAN” and verify that the pumps run.

- **For pumps with demand-dose controls**

Toggle the pump control switches to “AUTO” and check the functioning of the float switches by lifting the low-level, mid-level, and high-level float switches in turn and verifying their signals in the control panel.

- **Ventilation system**

Verify that the ventilation fan is operational and that there is air flow at the vent inlet and at the vent exhaust.

- **Control panel touch screen (if applicable)**

Verify that the touch screen is operational.

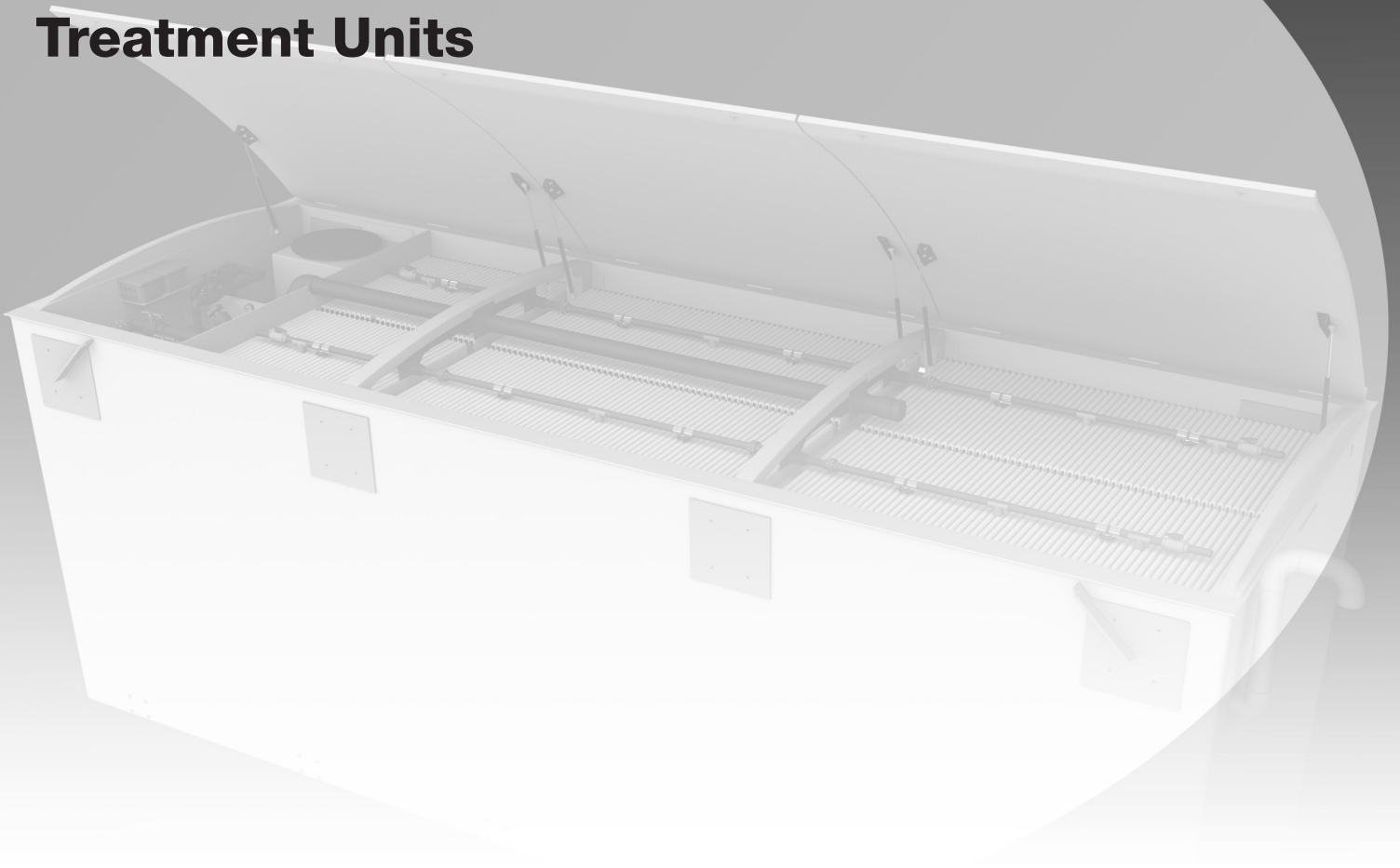
**Step 8f:** After making sure that the AX-Max unit(s) are functional and operating properly, close and secure all unit lids.

**Step 8g:** Schedule a system start-up with the project engineer, AdvanTex dealer, and system operator.



# Installation Manual

## AdvanTex® AX-Max™ Treatment Units



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