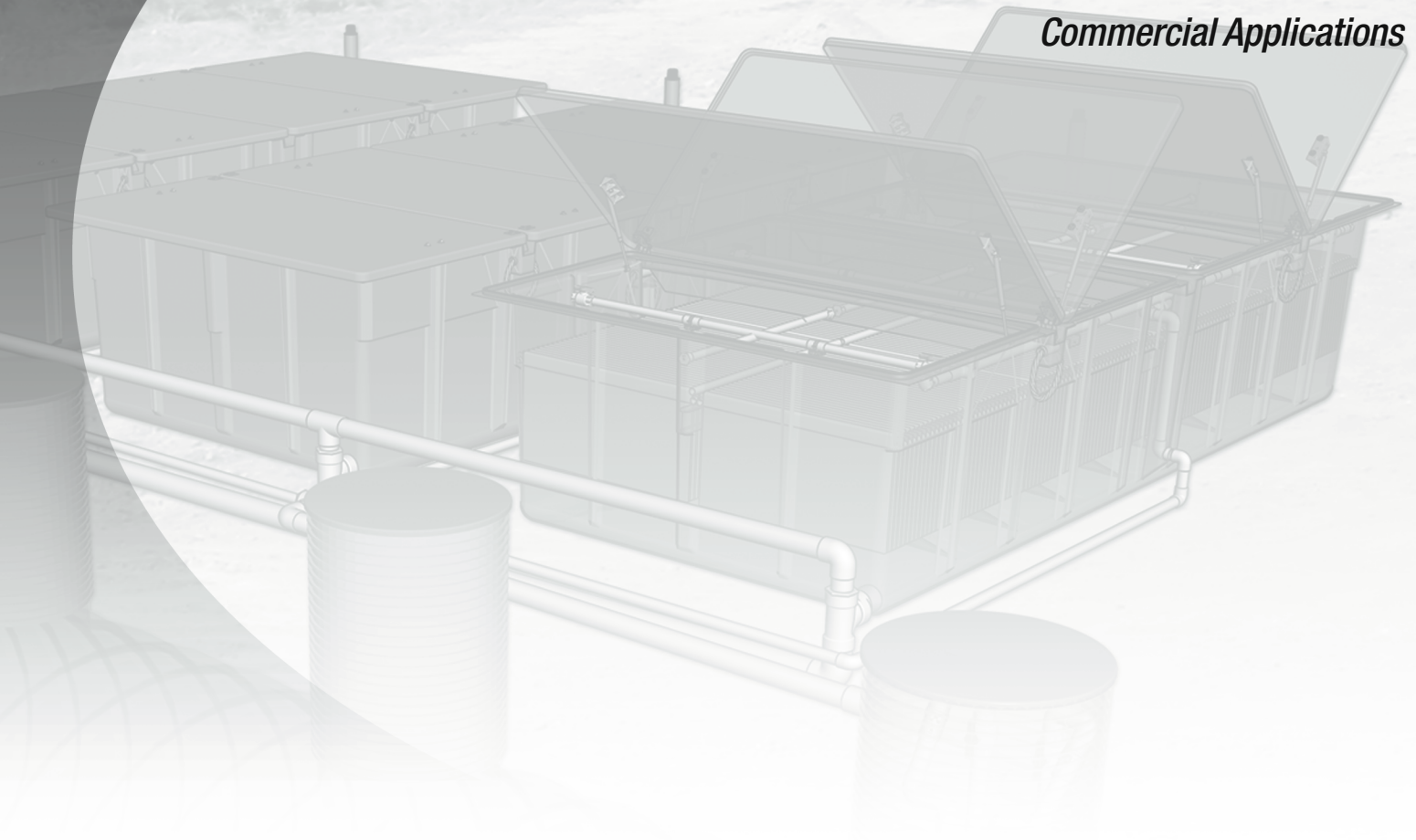


Installation Manual

AdvanTex[®] **AX100 Treatment Systems** *Commercial Applications*



Orenco[®]
S Y S T E M S

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About 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 — more 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.

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 must be completed in order 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.

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. You'll save time and money on installation day, and you'll get fewer call-backs.

This manual provides basic information for installing AdvanTex™ AX100 Treatment Systems. It does not replace training or engineering plans. Depending on the complexity of the treatment system, not all of its components may be covered in these instructions. For installing treatment system components not described in these instructions, contact your Dealer or Orenco.

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.

If you are not an Authorized AdvanTex Installer, contact your local AdvanTex Dealer for training and authorization before installing this system. The Dealer can provide technical support, training, and replacement components. To find the nearest Dealer, check the Distributor Locator page at www.orenco.com. If there is no local Dealer, call Orenco Systems, Inc. at (800) 348-9843 or +1 (541) 459-4449.



IMPORTANT:

- *DO NOT* plumb the backwash discharge from a salt-type water softener into an AX100 unit or preceding primary treatment tank.
- Failure to follow these instructions will void the system's warranty.
- Contact your AdvanTex Dealer with questions about any plumbing arrangements that may interfere with the systems' functioning.



Key Points:

- All tanks used with AdvanTex Treatment Systems must be pre-qualified. Call your Dealer for specifics.
- Inspect your order for completeness and inspect each component for shipping damage.
- Check to be sure instructions and items supplied comply with your state and local regulations.
- Carefully read and follow all instructions.
- If you are not a trained AdvanTex Installer, contact your local Dealer or Orenco for training before installing this system.
- Improper installation may void warranties.



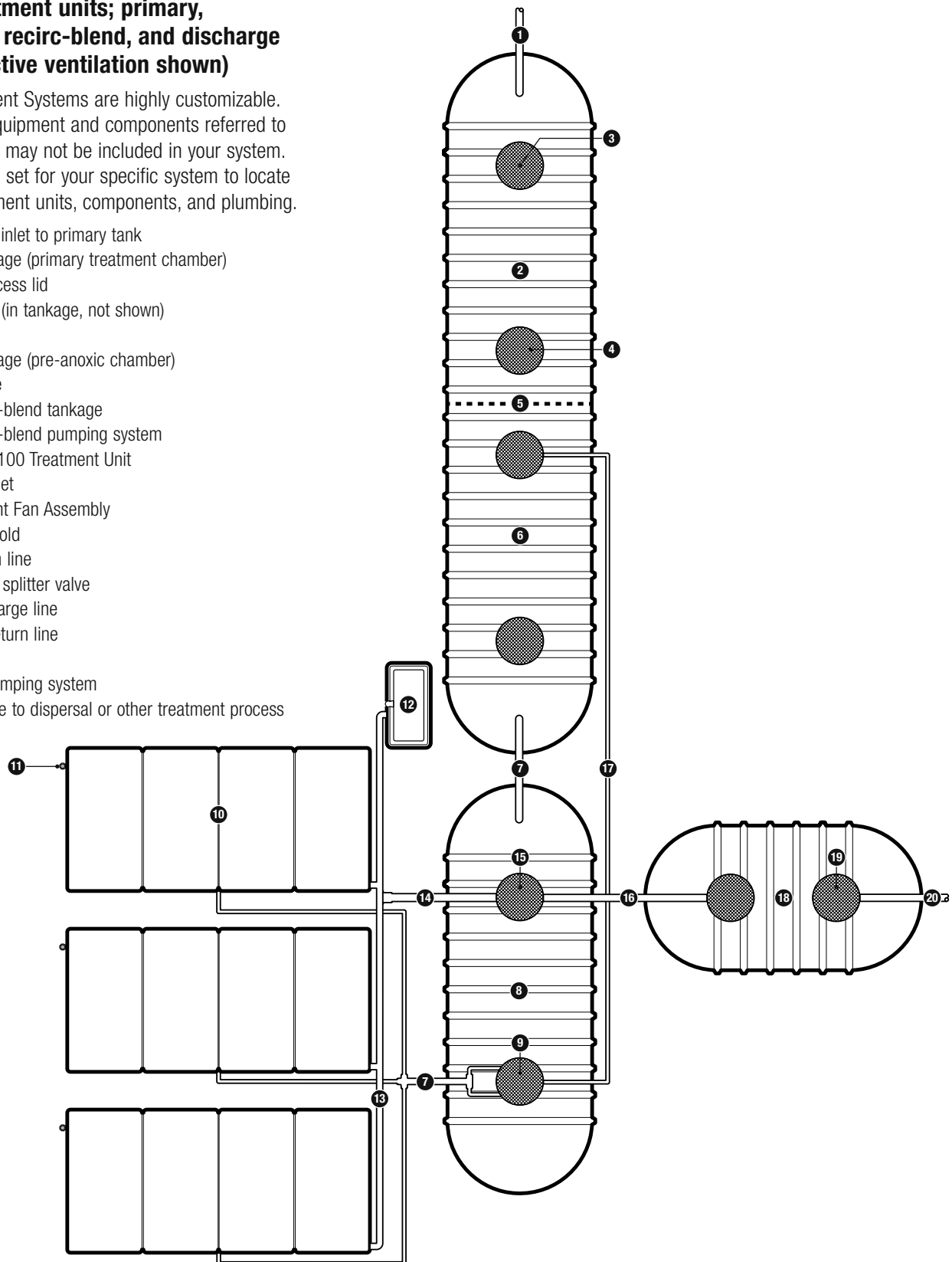
Note: All pipe diameters provided are U.S. nominal PVC pipe sizes. If you are using metric pipe, you may need adapters to connect to the U.S. fittings supplied with AdvanTex Treatment Systems.

Sample System Components

Sample AdvanTex Treatment System (three AX100 treatment units; primary, pre-anoxic, recirc-blend, and discharge tankage; active ventilation shown)

AX100 Treatment Systems are highly customizable. Some of the equipment and components referred to in this diagram may not be included in your system. Check the plan set for your specific system to locate tankage, treatment units, components, and plumbing.

- 1 Raw sewage inlet to primary tank
- 2 Primary tankage (primary treatment chamber)
- 3 Riser and access lid
- 4 Effluent filter (in tankage, not shown)
- 5 Baffle wall
- 6 Primary tankage (pre-anoxic chamber)
- 7 Transport line
- 8 Recirculation-blend tankage
- 9 Recirculation-blend pumping system
- 10 AdvanTex AX100 Treatment Unit
- 11 Ventilation inlet
- 12 AdvanTex Vent Fan Assembly
- 13 Filtrate manifold
- 14 Filtrate return line
- 15 Recirculating splitter valve
- 16 Filtrate discharge line
- 17 Pre-anoxic return line
- 18 Dosing tank
- 19 Discharge pumping system
- 20 Discharge line to dispersal or other treatment process



Installation Overview

- Step 1:** Review and compare the plan set with the installation site and components.
- Step 2:** Perform the excavations for any tanks required by the plan set, if the tanks have not already been installed.
- Step 3:** Prep and set all of the tanks required by the plan set, if they have not already been installed.
- Step 4:** Install tank adapters, riser components, and risers on the tanks, as required by the plan set.
- Step 5:** Perform a watertightness test on all tankage and tank-to-riser connections.
- Step 6:** Install the RBV and make any necessary adjustments to the cage and stinger.
- Step 7:** Perform the excavations for the AX100 unit(s), per the plan set.
- Step 8:** Prep and set the AX100 unit(s).
- Step 9:** Install pump package(s) into tank(s), per the plan set.
- Step 10:** Assemble and connect the transport lines between the tank(s) and AX100 unit(s).
- Step 11:** Install the AX100 unit ventilation system.
- Step 12:** Mount and wire the control panel(s).
- Step 13:** Backfill the installations, as well as all plumbing and in-ground electrical runs.
- Step 14:** Prepare the system for start-up.

Installation Steps

Step 1: Review and Compare Plan Set

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

- Make sure there are no obstructions on the site that could interfere with the installation.
- Check that all component and plumbing locations and elevations match the engineering plans.
- Check that all component and plumbing locations are compatible with the site's topography.
- Discuss any differences between the plans, the site, and these instructions with the engineer before continuing.



Key Point: All gravity transport piping must maintain a minimum slope of 1/8 in. per ft (10 mm per meter or 1%).

Step 2: Perform Tank Excavations (if Needed)

Step 2a: Perform the excavations for the system's tanks.

- Mark the excavation site(s).
- Excavate the hole(s) to the depth listed in the plans. Follow the manufacturer's instructions.
- If necessary, install shoring before continuing. Consult the engineer and applicable regulations for shoring requirements.

Step 2b: Prep the bottom of the excavation(s).

- Follow the manufacturer's instructions.



Installation Steps



Step 3: Prep and Set Tanks

Prep and set the system's tank(s). Follow the manufacturer's instructions.



IMPORTANT: Take care to keep everyone clear of the excavation when placing the tank(s)!



Key Points:

- Set the primary tank at the correct depth to connect to the sewer inlet.
- All gravity transport piping must maintain a minimum slope of 1/8 in. per ft (10 mm per meter or 1%). Set tank elevations accordingly.

Step 4: Install Tank Adapters and Risers

Step 4a: Install the tank adapters if they haven't been installed. Follow the manufacturer's instructions.



- For Orenco PRTA24 or PRTA30 Tank Adapters, see NIN-TA-PRTA-2, *PRTA24 and PRTA30 Tank Adapter Installation*.
- For Orenco RRFTA30 Tank Adapters, see NIN-TA-RRFTA-1, *Installing RRFTA30 Tank Adapters*.
- For Orenco RRFTA24 Tank Adapters, see NIN-TA-RRFTA-2, *Installing RRFTA24 Tank Adapters*.
- For Orenco FRTA30-FRP Tank Adapters, see NIN-TA-FRTA-1, *FRTA30-FRP Tank Adapter Installation*.
- For Orenco FRTA24-R or Orenco PRTA30 Tank Adapters and Roth Fralo tanks, see NIN-RLA-RR-2, *Roth Tank Adapter Installation Instructions*.



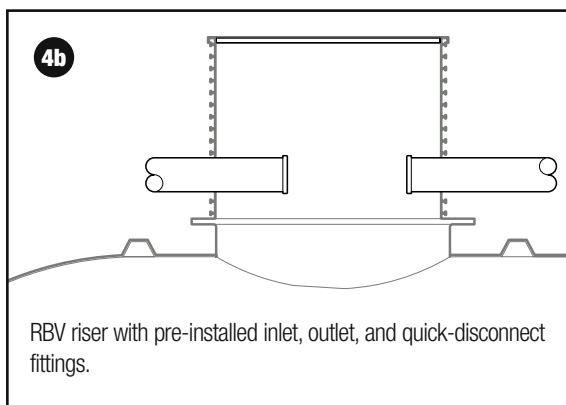
Key Points:

- If you don't see instructions in this list for your tank adapters, call your Dealer for assistance.
- Watertight seams and penetrations are critical for proper performance.

Step 4b: Install the access risers and any associated components.



- Be sure you install the RBV riser (with pre-installed inlet, outlet, and quick-disconnects) in the correct place on the recirc-blend tank and in the correct orientation.
- To install grommets in access risers and attach the risers to Orenco tank adapters, see NIN-RLA-RR-1, *PVC Access Riser Installation*.
- For Orenco external splice boxes, see NIN-SB-SBEX-1, *External Splice Box (SBEX) Installation Instructions*.
- For Orenco internal splice boxes, see NIN-SB-SB-1, *Internal Splice Box (SB) Installation Instructions*.



Installation Steps

Step 4: Install Tank Adapters and Risers, cont.



Key Points:

- Watertight seams and penetrations are critical for proper performance.
- Before installing the risers, make sure that ...
 - All risers are the correct height — the recommended riser height is 2 inches (50 mm) above final grade.
 - All risers are being installed in their correct locations.
 - All penetrations are at the correct height for the connections.
 - All penetrations are aligned correctly for good component access.
- After installing the risers, make sure that ...
 - All adhesive seams are free of voids, with smooth, continuous fillets.
 - The adhesive is set before backfilling or testing watertightness.

Step 5: Test Tanks and Adapter Seams for Watertightness

Test all system tanks and all tank-to-riser seams for watertightness. Follow the manufacturer's instructions.

- Some manufacturers require a partial or full backfill around the tank before testing watertightness.
- Use NIN-RLA-RR-1, *PVC Access Riser Installation* instructions to test the seams between the access riser, tank adapter, and tank for watertightness.



Key Points:

- Make sure all adhesive between the tanks, adapters, and risers has set before performing watertightness testing.
- Plug the tank's inlet and outlet before testing watertightness.
- All seams between the tank and access riser must pass the watertightness test before you continue.
- Follow all applicable regulations for watertightness testing.
- Once the tank and riser joints are proven to be watertight, drop the water level in the tank to just below the invert of the inlet (or outlet, if present).

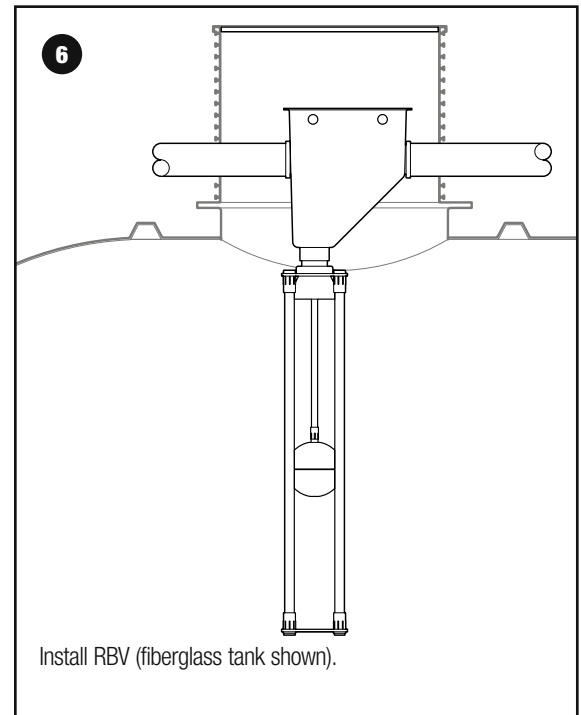
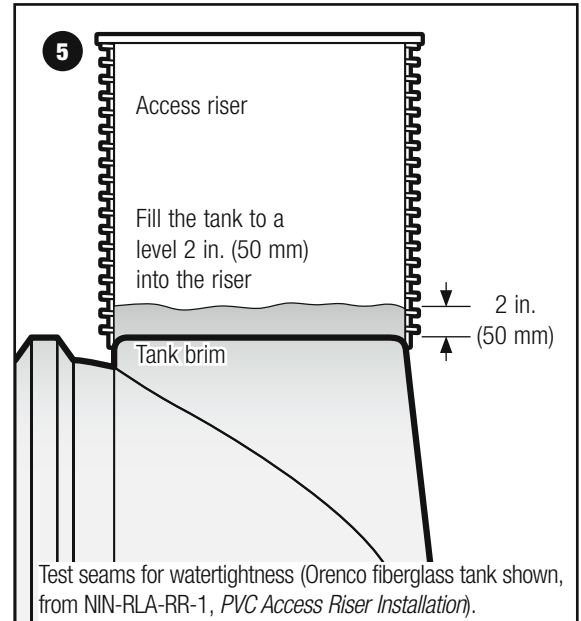
Step 6: Install Recirculating Ball Valve (RBV)

Install the RBV into the RBV riser. For more information, see NIN-RSV-4, *Recirculating Ball Valve*.

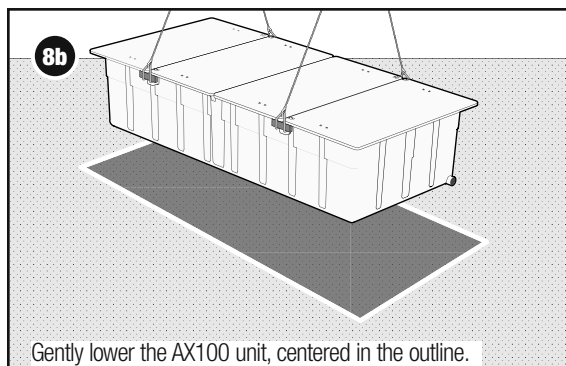
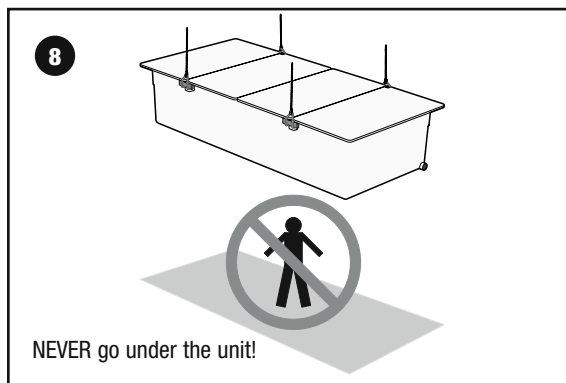
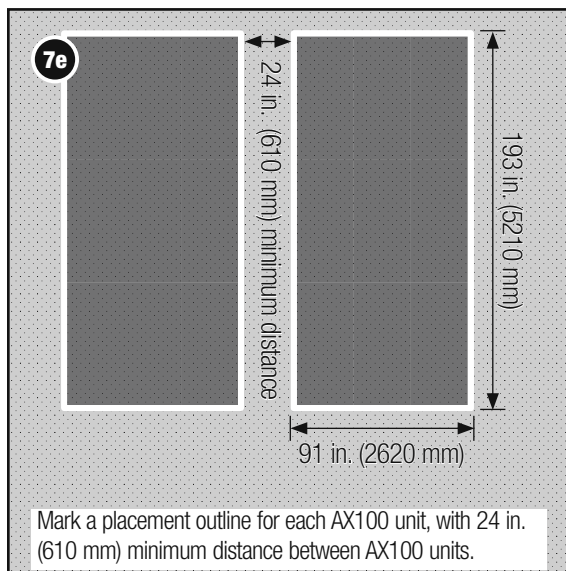
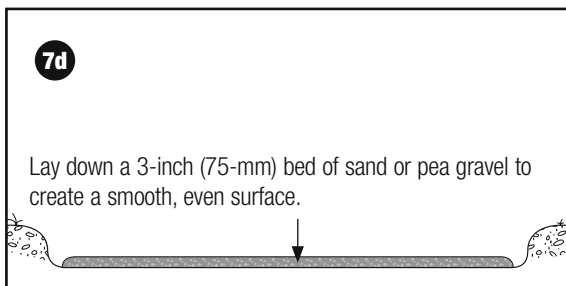
- Slide the RBV into the quick-disconnect fittings inside the RBV riser.
- To keep the RBV from rotating, drive the supplied stainless steel set-screws into the flanged fittings on the RBV.
- If the stinger or cage need to be adjusted, contact the engineer or Orenco for more information.



IMPORTANT: Follow all applicable safety precautions when installing the RBV.



Installation Steps



Step 7: Perform Excavations for AX100 Units

Before excavating, placing, and leveling pads for the AdvanTex units, check the plan set and make sure there are no obstructions that might prevent installation of the AdvanTex Treatment System.

Step 7a: Excavate the pad for the units to the depth needed for the compacted 3-in. (75-mm) bed to provide the correct transport line falls between tankage, units, and other components.



IMPORTANT: Do not bury AX100 units. Do not set the bottom of a unit more than 9 inches (230 mm) below the natural grade!



Key Points:

- All gravity piping and ventilation piping must maintain a minimum slope of 1/8 in. per ft (10 mm per meter or 1%). Set all AX100 units accordingly.
- A minimum of 24 inches (600 mm) is required between AX100 units.

Step 7b: Remove all debris, rocks, and sharp objects from the floor of the pad.

Step 7c: Compact the floor of the pad for levelness and to prevent uneven settling.

Step 7d: Lay down a 3-inch (75-mm) bed of sand or pea gravel to create an even, smooth surface.

Step 7e: Mark a placement outline on the pad for each AX100 unit.

- Paint, chalk, string, etc. can be used to mark the placement outline.
- Minimum outline size is 193 in. × 91 in. (5210 mm × 2620 mm). This represents the dimensions of the unit's top.
- Leave at least 24 in. (610 mm) between the placement outlines.

Step 8: Prep and Set AX100 Units

Step 8a: Prepare the AX100 unit(s) for lifting and setting into place.

- For offloading instructions, see NIN-ATX-AX-2, *AX100 Offloading Instructions*.



IMPORTANT:

- Make sure the lids are bolted down before lifting AX100 units.
- Use only lifting equipment rated for the AX100's size and weight (193 × 91 in. or 5210 × 2620 mm and 2000 lbs or 907 kilos)!
- NEVER go underneath an AX100 unit!

Step 8b: Use appropriate lifting equipment to lift and place the AX100 unit on the pad, centered in the placement outline.

- Leave at least 24 in. (610 mm) between the AX100 units.



Key Points:

- The outlet is permanently installed in one corner of the AX100 unit.
- Make sure the outlet placements for the unit(s) match the plan set.

Installation Steps

Step 9: Install Pump Packages in Tanks

Review the plan set and identify all tanks that require a pump package. Install pump packages as required by the plan set.

Step 9a: Install filters and flow inducer(s) or Biotube[®] pump vault(s).



Key Point: Placement and orientation of flow inducers and pump vaults are important — they affect the location of the pump(s), discharge assembly, and splice box.

Step 9b: Install the pumps and discharge assembly.

- For 4-in. (100-mm) submersible effluent pumps with HV-style discharge plumbing, see NIN-HV-1, *Installation Instructions for 4-in. (100-mm) Pumps and HV-Style Discharge Assemblies*.



Key Points:

- Make sure the pumps' voltages and design gpm or L/sec are correct for the installation.
- Align the discharge assembly and flow inducer or pump vault so the operator can easily remove the Biotube cartridge and pumps.
- Hand-tighten all fittings. Don't use tools to tighten the plumbing connections and fittings between the pump and the discharge assembly.



IMPORTANT: DO NOT lower or raise pumps by their cords! This can damage pumps!

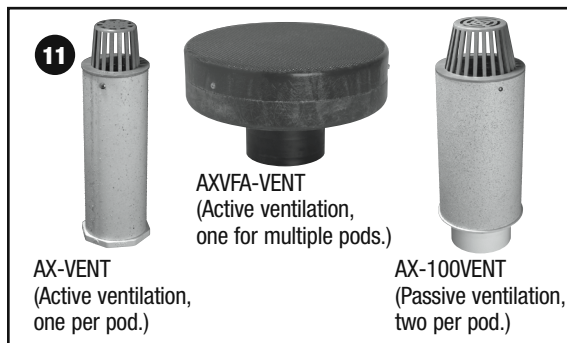
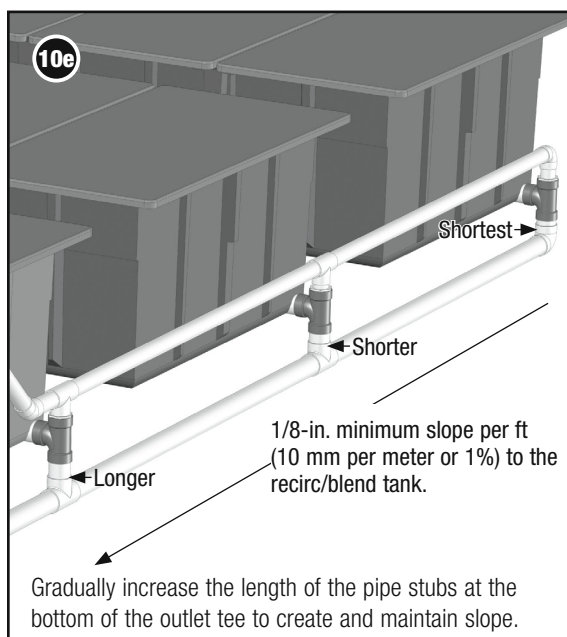
Step 9c: Install the float switch assemblies for each pump package.

- For installation, see NIN-MF-1, *Float Switch Assemblies*.
- For settings or adjustments in recirculation/blend tankage, see the engineering plans for the project. If the engineering plans do not provide settings, contact the engineer.



IMPORTANT: DO NOT change the float tether lengths.

Installation Steps



Step 10: Assemble and Connect Transport Piping



Key Points:

- Make sure all connections are properly glued.
- Only use PVC primer on PVC-to-PVC joints.
- Do not use PVC primer to connect PVC and ABS components.
- Apply UV-resistant paint to any PVC pipe that will be exposed to sunlight.

Step 10a: Route and connect the raw sewage inlet to the primary tank if it has not been done.

Step 10b: Route and connect the transport line between the primary tank and recirc/blend tank if it has not already been done.

Step 10c: Route and connect the transport line between the recirc/blend tank and pre-anoxic tank or chamber if it has not already been done.

Step 10d: Route and connect the transport line(s) from the recirc/blend pumping system into the inlet coupling(s) on the AX100 unit(s).

- Remove the red protective plug from the inlet coupling on the AX100.
- Connect the transport line to the AX100 unit.

Step 10e: Assemble and connect the filtrate return line (single AX100 units) or manifold (two or more AX100 units) between the pods and the RSV.

- Remove the red protective plug from the outlet coupling on the AX100.
- Connect the filtrate return line or manifold to the AX100 unit(s).



Key Points:

- Make sure the filtrate return line or filtrate return manifold maintains a minimum slope of 1/8 in. per foot (10 mm per meter or 1%).
- Maintain the proper slope in a filtrate return manifold by incrementally increasing the length of the pipe stub at the bottom of each outlet tee. The pod furthest from the recirc/blend tank should have the shortest pipe stub, while the pod closest to the tank should have the longest stub.
- For proper drainage and air movement, brace the transport piping to avoid bowing, sagging, or flat sections in the line.

Step 10f: Route and connect any required transport lines from the RBV to downstream components, tankage, and dispersal.

Step 11: Install AX100 Ventilation System

AX100 units use one of three ventilation methods:

- Active ventilation with a single common air inlet vent and a single common ventilation line (bermed units only).
- Active ventilation with separate air inlet vents (bermed or exposed units).
- Passive ventilation with two vents per AX100 pod; requires a vent at the filtrate outlet and at the unit's vent intake (special order only).

Installation Steps

Step 11: Install AX100 Ventilation System, cont.

Refer to the plan set to determine whether the AX100(s) require active or passive ventilation and then follow the applicable instruction set in this Step.

- For active ventilation systems with equipped heaters, contact the system designer or Orenco.

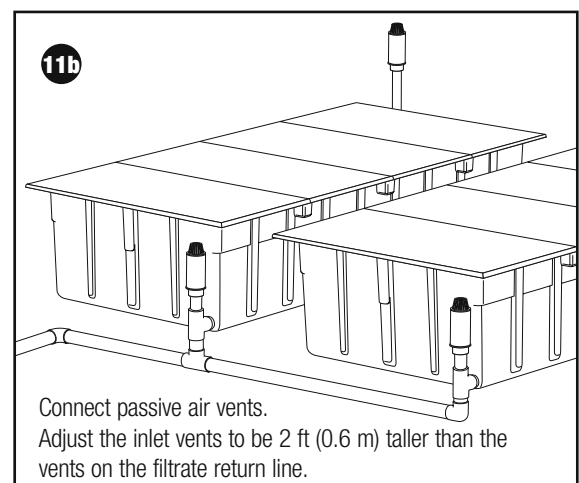
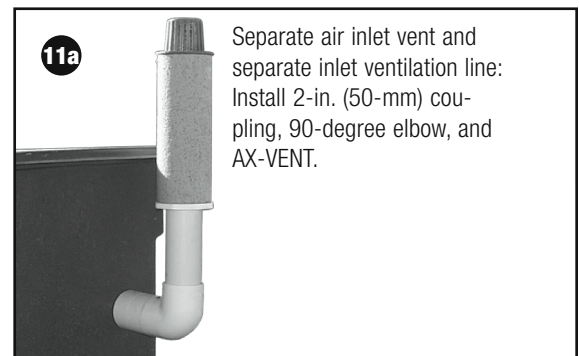
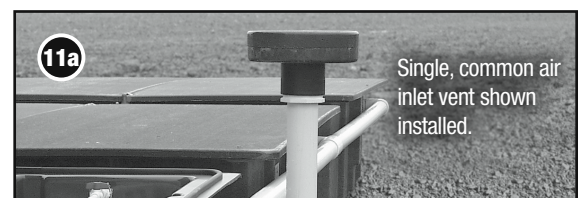
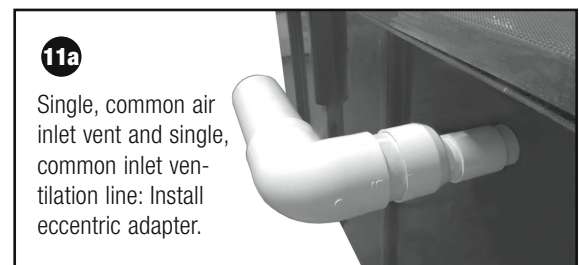
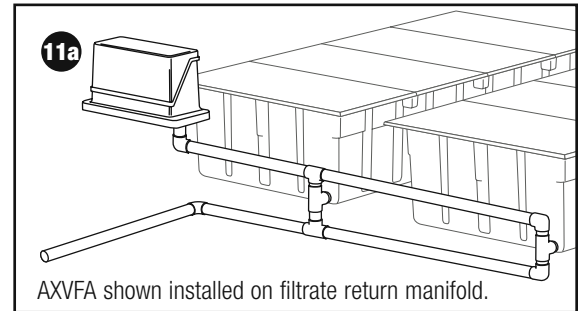
Step 11a: Installing Active Ventilation Systems

- Route the ventilation pipe between the vent fan assembly site and the filtrate return line or manifold.
- Make sure the ventilation pipe maintains a minimum slope of 1/8 inch per foot (10 mm per meter or 1%) back to the return line or manifold.
- Glue the ventilation pipe into the filtrate return line or manifold.
- Prep and install the AX Vent Fan Assembly (AXVFA).
- For detailed installation instructions, see NIN-ATX-VFA-1, *Vent Fan Assembly: Installation, Wiring, and Maintenance Instructions*.
- Use the correct diameter pipe and fittings, as specified in the plan set, to connect the AXVFA to the air vent line from the AX100 units.
- Install the AX100 vent(s).
 - Single, common air inlet vent and a single, common inlet ventilation line ...
 - Install 3-to-2-inch eccentric adapters on the AX100 unit's 2-inch vent fittings. The fittings are located on the end of the pod opposite the filtrate outlet coupling.
 - Build the common ventilation line between the eccentric fittings on the AX100 units.
 - Make sure the ventilation line connections slope back to the pods to avoid condensation.
 - Install the AXVFA-VENT common air vent unit on the ventilation line. It can be painted, if needed.
 - Separate air inlet vents and inlet ventilation lines ...
 - Install a 2-in. (50-mm) coupling on each AX100 unit's vent fitting.
 - Install a 90-degree elbow on each coupling.
 - Trim the AX-VENT pipe stub to length, if needed.
 - Attach the AX-VENT to the 90-degree elbow. DO NOT glue the AX-VENT in place!

Step 11b: Installing Passive Ventilation Systems

To use a passive ventilation system, AX100 units have to be factory-configured specifically for this application. Passive ventilation for AX100 units requires two Orenco AX100-VENT vent filters.

- Connect an AX100-VENT vent filter to the filtrate outlet tee on each AX100.
 - Trim the AX-VENT pipe stub to length, if needed.
 - DO NOT glue the vent in place.
- Connect an AX100-VENT vent filter to the AX100 unit's air inlet fitting.
 - Adjust the AX-VENT pipe stubs to be 2 ft (0.6 m) taller than the first vent.
 - DO NOT glue the vent in place.



Installation Steps



Step 12: Mount and Wire Control Panel



Notes:

- This step should be performed by a licensed and qualified electrician.
- Installation instructions, schematics, and wiring diagrams specific to the panel and float switch configuration are included with each panel. If any of these are missing, contact your Dealer or Orenco for a replacement.

Step 12a: Mount the panel using the instructions that came 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 and at a service-friendly height.
- 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 12b: Route and install any necessary electrical conduit.

Step 12c: Route all system-related wires and cables into the control panel and make connections as shown in the system's wiring diagram.



IMPORTANT: Follow all applicable regulations and electric codes.



Key Points:

- 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 Orenco seal kit.

Step 12d: Connect electrical power to the control panel.

Installation Steps

Step 13: Backfill Installations



Key Points:

- Maintain the slope of transport pipes, filtrate lines, and filtrate manifolds during backfilling. Brace them or place them on compacted beds and then carefully fill around them.
- Keep electrical conduits from shifting during backfilling. Brace or place them on compacted beds and then carefully fill around them.

Step 13a: Perform the final backfill of the system's tankage.

- Follow the tank manufacturer's instructions for backfilling.

Step 13b: If ground or surface water is a concern, place curtain drains around the site of the AX100 unit(s).

Step 13c: Check the plan set to find out if the AX100 unit(s) require berming.

Step 13d: If the plan set requires, berm around the AX100 unit(s).

- Make sure all AX100 unit lids are fastened and secured before berming.
- Berm and compact around each AX100 unit in maximum 12-inch (300-mm) lifts.
- Slope the finished grade away from AX100 units to prevent surface water from ponding on or around them.
- Make sure the top of each AX100 unit is at least 3 in. (75 mm) above final grade.



IMPORTANT:

- *Do not set the bottom of an AX100 unit more than 9 in. (230 mm) below the site's natural grade!*
- *Do not over-compact the berm material. Over-compaction can deform the AX100 unit.*
- *Do not use native material to berm AX100 units if it contains debris, large rocks (2-in. or 50-mm), or sharp rocks.*
- *If native material is unsuitable, use sand or pea gravel as berm material.*

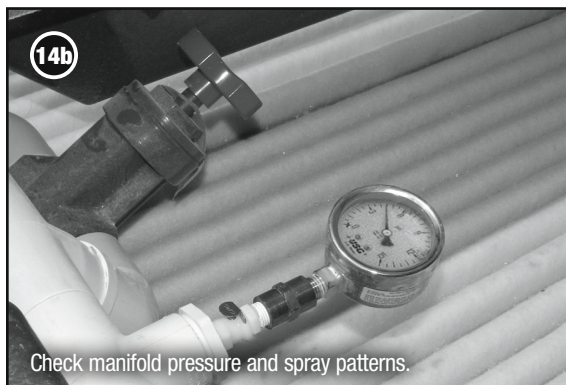
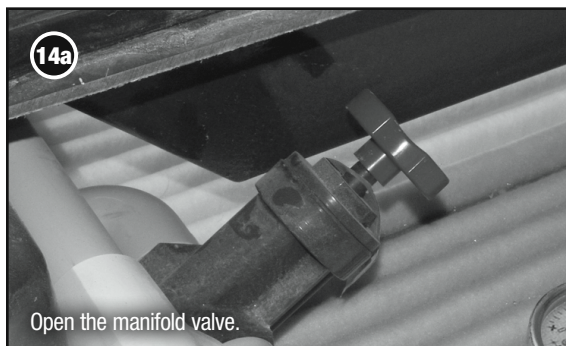
Step 13e: Backfill all of the piping and conduit runs.

Step 13f: Inspect the entire installation for exposed PVC pipe.

Step 13g: Paint all exposed PVC pipe with UV-inhibiting paint to protect against ultraviolet light.



Installation Steps



Step 14: Prep System for Start-Up

Step 14a: Use the pump in the recirc/blend tankage to flush the manifolds and laterals in each AX100 unit.

- Open the AX100's manifold valve.
- Turn the laterals until the spray nozzle turbines are pointed up.
- Open the outlet valves on the laterals.
- Flush the manifold and laterals with water.
- Turn off the recirculation pump.
- Close the outlet valves on the laterals.
- Turn the laterals until the spray nozzle turbines are pointed down.

Step 14b: Check and spray nozzle patterns in each AX100 unit.

- Adjust the valve on the manifold as needed to bring the square spray patterns to the edges of the splash guards – but not beyond them.

Step 14c: Make sure the following items have been installed correctly before scheduling the system start-up:

- Primary Treatment System
 - Septic Tanks
 - Septic Tank Pumping Equipment
 - Septic Tank Controls
 - Grease Tanks
- Secondary Treatment System
 - Recirc/Blend Tanks
 - Recirc/Blend Tank Pumping Equipment
 - Recirc/Blend Tank Controls
 - Distributing Valve Assembly
 - Ventilation Fan System
 - AdvanTex Filter
- Dosing Tank
 - Dosing Tank Pumping Equipment
 - Dosing Tank Controls
 - Distributing Valve Assembly
 - Dispersal System

Installation Steps

Step 14: Prep System for Start-Up, cont.

Step 14d: Make sure the following items have been completed before scheduling the system start-up:

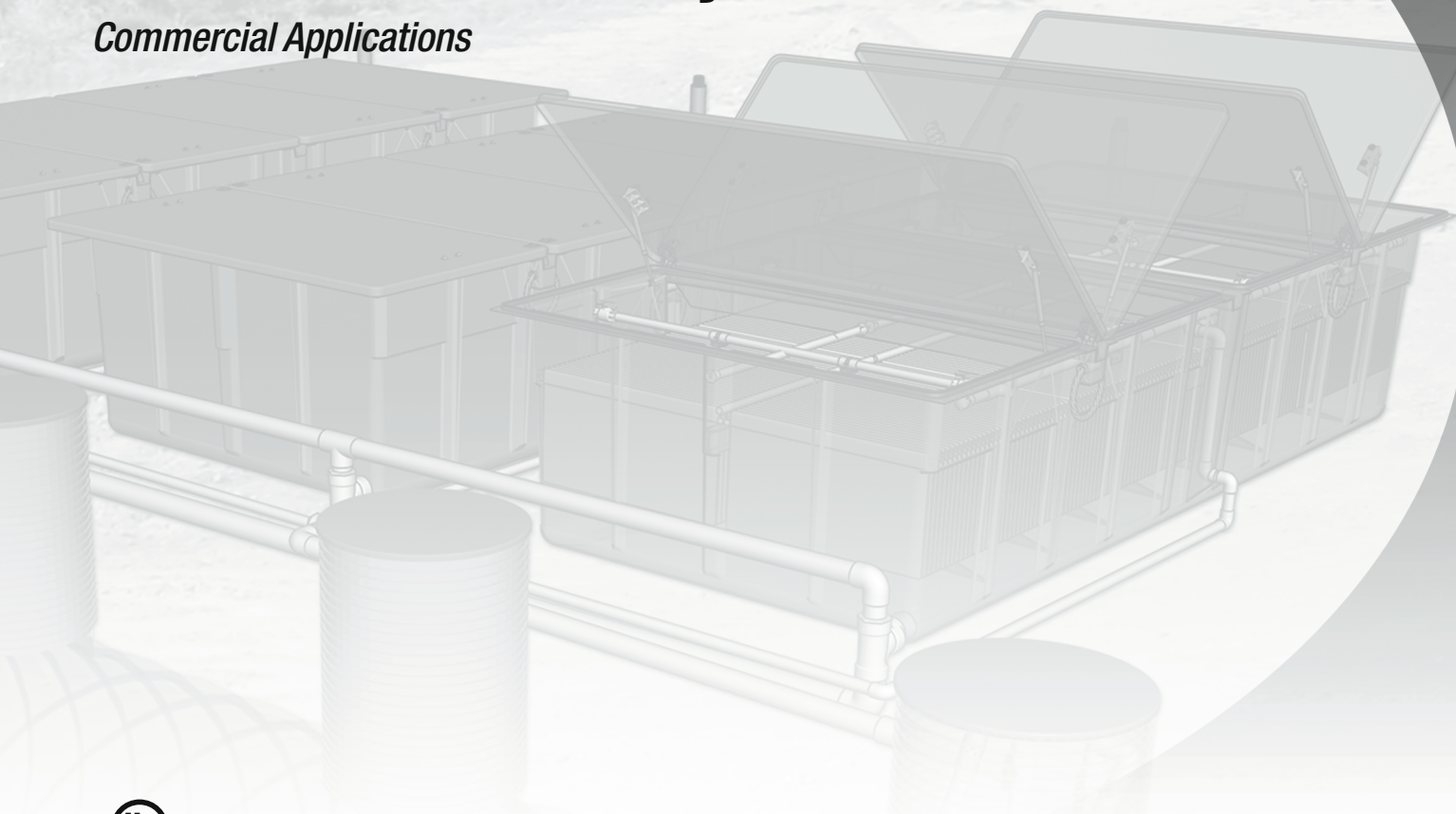
- All plumbing connections have been completed and tested.
- All electrical connections have been completed and tested.
- If a remote telemetry panel is being used, a working, dedicated phone line or high-speed internet line has been connected to the control panel to allow remote monitoring and control.
- All tankage has been successfully tested for watertightness.
- Liquid levels in all recirculation tankage are set to above the 100% discharge level.

Step 14e: When all of the system preparations are completed, contact the System Operator and the Engineer to schedule the official system start-up.

Installation Manual

AdvanTex® **AX100 Treatment Systems**

Commercial Applications



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