

Installation manual

Uponor Aeration and alkalization chambers



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1. Intended use

Uponor aeration and alkalization chambers are built and designed according to customer's needs. The chamber body is watertight, fast, and easy to install and self-anchoring. When built, installed, and maintained properly, its lifespan can be anticipated to be up to 100 years.

Aeration is a process where water is being oxygenized and therefore its pH-value rises, allowing the water's greater suspension reaction. Aeration removes carbon dioxide and radon as well as carbon monoxide, iron and manganese from the water and improves sensory quality (taste, smell, outlook). This results in mitigated risk of networks sedimentation and improves waters buffering abilities.

Aeration takes place by leading the water through veir to the aeration spoiler, where it is lead to the chamber base. The water flows between aeration fragments to the bottom of the chamber, where aeration can be enhanced by directing air through the water.

Alkalization is used to rise waters pH-value by leading the water through crushed limestone. Low alkalinity / pH of the water reduces the risk of corrosion in the network. Alkalization by limestone is a risk-free way to better the water quality, for there is no risk of chemical overdose. Uponor-alkalization solution has safe, effective, and innovative design.

The raw material of the double-layer container is polyethylene for drinking water purposes whose chemical qualities and durability are excellent and there's no risk of corrosion. The reservoir's tightness has been factory-checked. The lid is lockable and ventilation pipes have been secured with filters to meet the hygienic requirements. The reservoir fills up all the qualifications of water transport, storage, and distribution.

2. Operating and working safety

The organization performing the installation or/and maintenance is responsible for following the respective laws, rules and regulations about the working safety and safety gear of the personnel. All employees on the installation site shall be educated or briefed into using safety equipment and gear. Personnel installing, operating, or maintaining the equipment chamber shall be qualified to operate with drinking water. The lids to technical chamber must always be locked and they should only be opened for operating and maintaining purposes. The light is to be switched on every time when entering the equipment chamber and ventilation is to be checked before starting the operative or maintain work.

When implementing normal operating and maintenance work in the chamber, all personal gear and tools shall be clean, appropriate, and according to the work in progress.

3. Delivery and acceptance check

The delivery time and other aspects of aeration / alkalization chamber is agreed between customer and supplier. The information regarding the specific date and delay terms are communicated to the customer in order confirmation.

The chamber must be overall checked at the delivery. Flaws or damages caused by transport or storage must be documented to the consignment note. Possible flaws that are noted after the delivery must be communicated within 7 days or at the latest 7 days after the flaw has occurred.

Supply of the aeration fragments or crushed limestone or gravel for alkalization is to be done by the customer.

4. Storage and transport

The equipment chamber is to be stored on a flat platform in its original packaging. It should always be handled with care. The chamber body might get slippery in rain and in cold weather conditions. Handling and installation of the chamber should be avoided at -20° C weather.

The chamber or any products or pipes connected to it should never be dropped, thrown, or dragged. Note that especially during the wintertime any kind of striking or hitting the chamber or respective products and pipes should absolutely be avoided.

Prevent any kind of connection between the chamber and chemicals, gasoline or diesel or a source of heat. Protect the chamber and respective products from mischief during the storage.

The chamber, pipes and other products shall be protected from any pointy or sharp burdens during delivery or storage – note especially the transportation platforms. The transportation platform shall be clean and flat, and it should not have any pointy or sharp objects. Sliding or bending of the chamber or its respective pipes and products shall be prevented. When binding the load, wide cargo straps shall be used. Using of cables, wires or chains is prohibited.

5. Before installation

Aeration- and alkalization chambers can be installed on the ground, inside of a building or under the ground according to customer's needs.

Before installing the aeration and/or alkalization chamber or possible connective equipment it must be checked for damages or any flaws by transportation. Usually, the customer is responsible of handling the chamber and other equipment and installing at the site.

The customer is responsible of following:

- Arranging a suitable location point for the equipment chamber in cooperation with local authorities, if permits or other needed
- Easy access for transport equipment to site
- Arranging suitable and adequate lifting gear on site
- Arranging relevant electrical and other connective work (welding etc)
- Excavation and fill on site with suitable materials and by suitable methods if the chamber is to be placed underground.

Any work on site, including excavation and filling, shall be done in compliance with respective legislation and regulations.

Trench

If the ground on site is poorly permeable by water (for example clay), installing draining into the trench should be taken into consideration. The chamber body is self-anchoring, so there's usually no need for extra precautions against ground water's buoyancy forces.



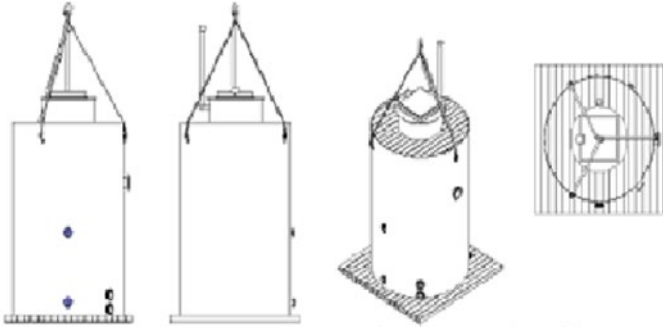
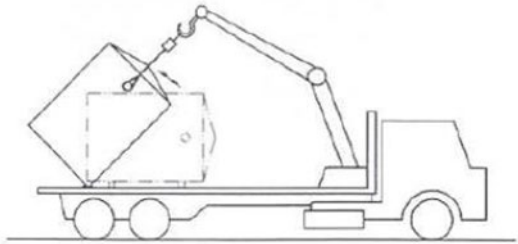
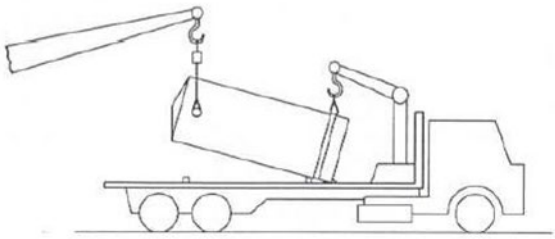
When digging the trench, special care and consideration shall be pointed into following the site plan, working safety and qualified personnel to have the base and filling done on-site as fluently and sustainably as possible. Trench work shall be done according to respective legislation and regulations. When installing the equipment chamber, it is especially important to handle connected parts with care. To mitigate the risk of malfunction or other harm it is important to secure the straightness of the chamber before and during the installation. During installation it shall be secured that the surface water doesn't have access inside the chamber at any point (through maintenance lids for example). The eventual height difference between ground level and maintenance lids shall be at least 200 mm.

6. Lifting

There are numerous different hazards concerning lifting of the chamber. To mitigate them, lifting should always be planned carefully. Special liftings, such as heavy liftings, lifting of a big object or joint liftings require a written plan.

The following instructions are the main guideline for lifting Uponor Technical chambers.

- Only approved, checked and intact gear and equipment shall be used in liftings
- The chamber shall not be lifted with wires or other gear that might scratch or harm the surface
- Before start, the lifting capacity marked on the respective lifting gear shall be checked. The lifting gear shall be capable to handle the load at a minimum.
- The lifting must not be made over individual(s)
- The lifting jacks shall only be operated by specifically educated and selected personnel
- The lifting yokes are on the sides of the chamber under the lid cone.
- To avoid damage on the surface of the chamber the lifting should be operated with lifting belts and hanging loops made of artificial or other soft materials
- Parts attached to the chamber body (by welding or other) should be noted and handled with care when lifting
- The weight of the chamber and balance points shall be checked before adjusting lifting gear and lifting. If the balance point is not marked on the chamber body, it is in the middle of the chamber (width and height wise).
- The lifting gear should be set as open- or tightening lifting around the chamber
- A test lift shall be performed to height about half meters before the actual lift. If needed, the lifting shall be adjusted according to the balance points
- When lifting, normal instructions and principles concerning the lifting belt angle and shape coefficient shall be considered.

<p>The lifting yokes for the belts and hanging loops are in the bottom of the reservoir. Their spots have been marked on the body with this sign:</p>	
<p>Reservoir shall be lifted from the balance points. If there are no balance point markings, the balance point is in the middle. The balance point is marked on the sides of the reservoir with this sign:</p>	
<p>Lift the technical chamber as illustrated in the pictures:</p> <p>Wrap cargo wraps around the chamber body on self-tightening loop.</p>	
<p>Position the lifting wraps at about $\frac{1}{3}$ x height of the chamber. The minimum width of the wrap is 75 mm.</p> <p>Another elevating gear can be used to help the lifting.</p> <p>Ensure the safety and suitability of the lifting gear and follow the lifting plan.</p> <p>See illustrations:</p>	 <p>Figure C.3: Loading a large tank in the horizontal position</p>  <p>b) The tank is lifted clear using both cranes</p>

7. Electrical connections

The condition of electric devices shall be monitored before starting any installations.

Depending on the ordered solution, aeration and alkalization chambers may have cable inlets. Electric cables shall only be installed through this inlet.



Any electrical work shall be done by trained professional.

8. Commissioning

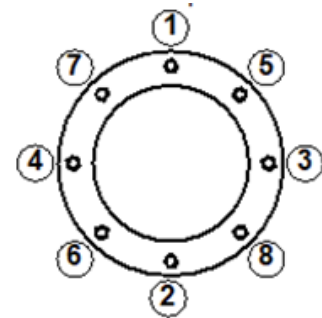
Documenting the commissioning actions is recommended.

The recommended order of bolt tightening is as in the picture:

The first tightening round shall be done by torque that is approximately half of the final tightness.

The aftertightening of the bolted connections shall be done before the disinfection of the chamber.

The tightness of flanges shall be checked, and the bolts tightened with a torque wrench.



Commissioning aeration

The customer shall purchase the aeration objects used inside the chamber to boost the aeration process according to the designer's calculations. After erecting the chamber, the objects are being let in, and both the chamber and objects are being disinfected before actual commissioning.

Commissioning alkalization

Before letting crushed limestone into the erected chamber, adding a layer of washed gravel of about 300–400 mm, grain size 8–16 mm is recommended so that the collecting and spooling pipes are covered. This is to avoid blocking of the pipes.

Purchasing gravel and crushed limestone shall be done by the customer. The thickness of the crushed limestone layer shall be determined by designer specialized in water utilities or potable water systems.

The alkalization chamber shall be disinfected before any filling takes place. Crushed limestone shall be pre-treated according to supplier's directions.

9. Maintenance

Documenting the maintenance actions is recommended.

Aeration chamber and the aeration particles shall be monitored and spooled if needed.

The chamber or the particles don't usually get dirty, but microbial film might be generated on the surfaces through time. Changing or maintaining of the aeration particles is to be done by supplier's directions.

Changing of the crushed limestone in the alkalization tank is usually not needed, it is only to be added as it dissolves. The speed of dissolving depends on the quality of the water and grain size. When evaluating the dissolving time, supplier of the crushed limestone should be consulted. The rule of thumb is that 100 m³ of treated water will consume 3 kilograms of limestone. Your Uponor-expert will help you with approximate calculations.

The collecting-spooling pipes of the alkalization chamber shall be rinsed with air and water approximately 1-2 times per year. The need of rinsing can be observed by monitoring the top of the limestone layer. The rinsing takes about 30-60 minutes. Customer shall prepare for the rinsing period by water reservoir, spare alkalization solution or other way. Strictly oil free compressors are to be used when rinsing.

The chamber body is practically free of maintenance, but the surroundings shall be kept clean and free of clutter and the chamber body as well as equipment checked visually for any flaws.

In the wintertime the maintenance lids and their surroundings shall be kept free from ice and snow. The ground frost insulation and/or thermal insulation of pipes can be done if needed according to a respective plan and concerning rules and regulations. The final landscaping is to be done by the customer.

The customer shall consider preparing for exceptional circumstances, such as power outage, with spare power source and / or -connection.

10. Recycling

Full plastic chamber body can be recycled as such by companies specialized in recycling plastic complexes into products, that don't require drinking water approval and allow using recycled raw materials. Up-to-date list of such companies can be viewed from local plastic manufacturers associations web pages.

11. Project specific data

Project specific data consist of e.g., type drawings, material certificates, recorded tightness studies, technology-specific manuals, and list of spare parts for example. They are selected and delivered to customer according to selected solution.

12. Contact information

[country specific contact information]

