AquaSust

AquaSust

# Disc Aerator Installation, Operation and Maintenance Manual

Applicable aeration disc model:

AS-DD215 AS-DD270

AS-DD350

AquaSust

# Catalogue

# 1. Overview

This manual details the installation, operation and maintenance requirements of the AquaSust disc (AS-DD215、AS-DD270、AS-DD350). Each shipment of aeration discs shipped by AquaSust contains an installation guide and strictly follow all recommendations in the manual to avoid disc failure or damage. For relevant details, please see our warranty statement, also available from our website http://www.aquasust.com/ Download. AquaSust strictly controls every step from the raw material to the final assembly of the product, and details the production process of the aerator disc, all of which are assembled in the AquaSust plant. Care should be taken to protect the aeration disc during transportation, storage and assembly. The sales of AquaSust aeration disc follows our standard terms of sale, the latest terms can be downloaded at the above website.

# 2. AquaSust Fine Bubble Disc Diffuser

### 2.1. Scope of application

The AquaSust Company provides aeration disc for the aeration process of sewage treatment plants. In the sewage treatment plant using the activated sludge treatment process, the microporous aeration provided by the AquaSust aeration disc can obviously improve the efficiency of sewage treatment. The EPDM diaphragm synthesized by special formula has good elasticity and durability, and can support the long-term intermittent operation of the aeration disc in the sequential batch treatment process.

### 2.2. Sewage composition

EPDM diaphragm produced by AquaSust are mainly used for conventional municipal wastewater as defined in DWA-M115. Sewage plant staff must continuously monitor and check the consistency of water quality parameter records. Certain chemicals may affect the performance of the exposed disc: especially the solvents and halogenated components may damage the EPDM. Other hydrocarbons such as oil, oil and fat also cause damage to EPDM membranes at higher than normal concentrations (25 ppm). Industrial wastewater treatment (usually industrial wastewater accounts for more than 10% of the treated wastewater that is considered industrial wastewater) may require other materials, such as silicone, fluorine rubber, etc. Most membranes required for industrial wastewater treatment may need to be pre-tested, and the relevant warranty terms also need special confirmation.

### 2.3. Preprocessing

Setting up appropriate mechanical grille, sand settling tank and oil trap plays a vital role in exerting the best performance of the aeration disc in the subsequent biochemical tank. Inadequate or no preconditioning will reduce the aeration efficiency. Regularly check whether the aeration disc in the aeration tank is attached to the accumulated filaments, and clean it according to the need, especially for the lifting units that need to be repaired. When the aeration unit attached to the filament pool is lifted to the water surface, the aeration disc diaphragm is easy to rupture.

### 2.4. Sunlight and ultraviolet radiation

Generally speaking, EPDM diaphragm is not affected by climate, and can resist ultraviolet radiation, but it is still necessary to avoid direct sunlight exposure disc, because the sun exposure is easy to heat up the black diaphragm to 80~100°C, resulting in accelerated aging of the diaphragm. When the aeration tank is emptied, the aeration disc should be washed and the diaphragm kept moist as much as possible, because once the sludge attached to the aeration disc is dried and hardened, the microholes on the diaphragm will be permanently blocked. Therefore, when the aeration system cannot operate normally, inject clean water into the aeration tank and keep the liquid level above the aeration disc.

### 2.5. temperature

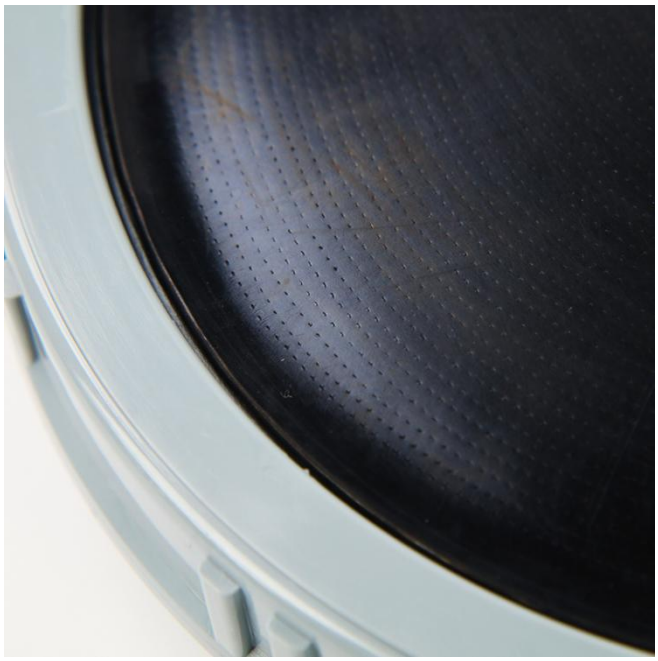
The water temperature should be maintained within + 5℃ ~ + 30℃. Avoid freezing at low temperatures, resulting in permanent damage to the aeration disc. The working temperature of the aeration disc shall not exceed + 60℃, and usually the stainless steel air riser will significantly reduce the air temperature. If any doubt, please confirm with AquaSust.

### 2.6. Air

In any case, the blower provides oil-free air. The failure of one blower may discharge the oil into the air main pipe, and the rest of the blower will push the oil to the aeration tray. Dust filter meeting the DIN EN 779 standard shall be used: dust removal rate> 90%, grade G 4. The air entering the blower shall also comply with the local regulations.

### 2.7. Air riser, air cloth chief and branch pipe

The dimensions and layout of the pipe system must meet the calculation and design requirements, and the pipe materials must meet the requirements of the use environment. The chemical resistance of the pipeline shall consider all possible aspects from sewage to air, including but not limited to the acid or other chemicals injected into the air flow, and the impact of the water flowing from the outside. About the present.



For the expansion or upgrade of pipes, all existing pipes, valves, fittings, etc shall be checked for the new requirements. Any corrosion will eventually lead to the failure of the aeration disc and even paralyze the entire aeration system. All air pipes connected to the aeration tray must be adjusted level with a tolerance range of ± 10 mm to ensure aeration uniformity. By controlling the total air volume, the air flow is automatically distributed to each pool, and if not, at least all the air branch pipes in the aeration tank shall be leveled to the same immersion depth.

2.8. Aeration disc size, material, weight, buoyancy and resistance

For detailed parameters of aerdisc, please refer to the data sheet within our product sample. The buoyancy of the aeration disc is related to the ventilation rate.

**2.9. Air pipe used for the installation of the aeration tray**

The aeration disc is generally mounted on a round pipe and can be connected by UPVC / ABS / SS304 pipe through a proprietary rubber saddle provided by AquaSust.

**2.10. Arrangement density of aeration disc**

In general, please refer to the aeration layout drawing provided by AquaSust. If a third party has provided a layout, please check whether the layout density of the air ator is within the range listed in the table below. This empirical data is for reference only. Please check with the designer for details.

Table 1: Recommended minimum and maximum spacing of the aeration discs in the aeration tank

| Model | minimum spacing (m) | Maximum spacing (m) |
|---|---|---|
| AS-DD215 | 0.5 | 1.0 |
| AS-DD270 | 0.6 | 1.2 |
| AS-DD350 | 0.7 | 1.4 |

# 3.Installation requirements

**3.1. Weather conditions**

Generally do not install aeration discs when the temperature is below + 5℃. If installation is required, cover the top of the pool and enforce ventilation for heating (all safety guidelines for heating shall be followed). Heat the aeration disc to above + 5℃ before removing it from the warehouse.

**3.2. Operation sequence and cleaning**

All operations in and above the aeration tank must be completed before installation, especially welding, drilling, cutting, grinding, spraying, concrete pouring, sealing, seam filling, etc. Remove all debris from the bottom floor, including stone, glass, nails, wood and other sharp pieces. Check the upper edge of the pool and all the beams and columns to avoid objects falling into the pool. Before the installation of the aeration tray, the aeration tank shall be in the preparation state for water inlet operation.

**3.3. Purge pipe system (the first purge)**

Check the blower to ensure that the blower is ready to transport air to the maximum flow of the aeration tank. Purge all pipes with maximum airflow, if necessary close the intake valves of all remaining aeration units and purge each unit / area to remove all debris in the pipes. Any residual debris in the pipeline may eventually block or damage the aeration disc, which is not within our warranty scope.

### 3.4. Installation of aeration tray (installation drawing on the end page)

- The opening diameter of aeration branch pipe shall be 31 mm (± 0.5 mm) and matched with 3 / 4 " rubber saddle. Level the pipe in the vertical axis direction with a tolerance of ± 3°%
- Remove the burr from all pipe openings
- Wet the rubber saddle with a lubricant for easy installation. Commercial grade water-based soap (5% -10% concentration) or household detergent is recommended(0.01 to 0.1%) as a lubricant. Lubricant is not allowed to contain mineral oils or hydrocarbons
- Press the rubber saddle into the opening of the pipe and rotate repeatedly until the rubber saddle just matches the radian of the pipe and fully completely into the pipe
- Turn the outer thread head of the aeration disc into the inner thread of the rubber saddle, and rotate it clockwise as far as possible, so that the last screw thread of the aeration disc is completely rotated into the inner thread of the rubber saddle. To prevent the rubber saddle, use 45 mm open plate hand
- When tightening the aerator disc, do not damage the aerator disc diaphragm and rubber saddle. If necessary, remove the aerator disc and tighten it again. During the installation process, replace the rubber saddle that has been irreversibly deformed or damaged

### 3.5. Second purge

Conduct the secondary purge as described in 3.3, and then install all the remaining pipe fittings on the cloth air branch pipe to complete the installation of the pipe and aeration tray.

# 4. Leakage point test and debugging

The aeration system of each aeration tank must conduct leak point testing and debugging, repair all leak points and repeat the testing. The Owner must sign and accept the commissioning in writing. Lack, incorrect or incomplete commissioning will result in the warranty failure and AquaSust will not be responsible for the consequences and damage. Use foam water into the tank to about 10 cm above the aeration disc. Run the aeration discs with the minimum or minimum possible gas volume (see Section 7 Data Sheet 1 for further details) and carefully check all pipes, pipe fittings, connectors, and aeration discs for leaks. If you need to walk around the pool, use appropriate personal protective equipment. Then raise the water level to 20 cm above the aeration disc for debugging, and run the aeration disc with medium gas volume (see Data Table 1 in Section 7) to check whether the immersion depth of the aeration disc is significantly deviated from the average value. Small deviations may be caused by differences in the surface of the diaphragm, which usually disappear after 1 or 2 weeks of operation (biofilm formation).

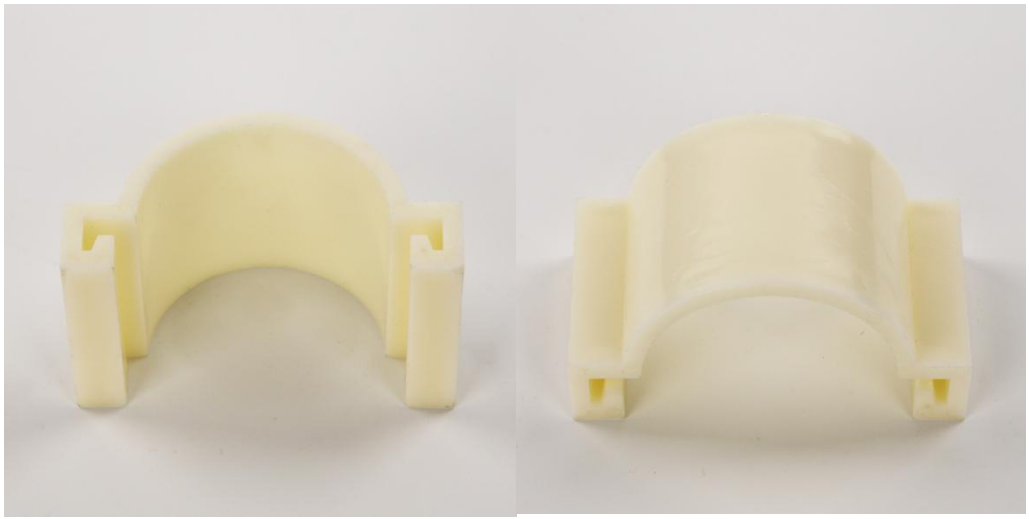
# 5. Idle time before starting the operation

Start the leakage point testing and commissioning immediately after the installation is completed. If commissioning fails not run immediately for any reason, follow these steps:

- Inject clear water into the aeration tank and raise the water level to 1 m, while allowing the aeration disc to operate the blower shall supply the air ator for at least 10 minutes per day.
- If the temperature is below freezing, raise the water level (below freezing point, an additional 20 cm) and increase ventilation time and ventilation if necessary.
- The aeration disc shall operate at the highest designed air flow rate for 1 week before formal operation.

# 6. Start for the first time

The end user must sign the written Installation and Commissioning Confirmation letter before officially starting the aeration system. All air dispensing facilities including blowers, valves, controls, pressure monitoring equipment etc. must also be approved. Operate the aeration disc only within the air volume range set by the aeration disc (see Section 7 Data Table 1 for details).



# 7. Routine operation of the aeration discs

During routine operation, adjust the ventilation amount of the aeration disc to control the dissolved oxygen concentration in the sewage of the aeration tank. Always keep the ventilation volume of the exposed disc within the recommended volume range (see Data Table 1). Excessive gas volume will reduce the oxygen transfer efficiency, and may eventually cause irreversible damage to the aeration disc diaphragm. Too low air volume may lead to uneven aeration / oxygen supply and substantial deposition of dirt on the diaphragm surface. Maximum overload volume flushing can be used regularly, but not exceeding 10 minutes every 24 hours.

Data Table 1:

| Size of product | Standard ventilation volume was Nm ³ / h | The maximum overload air volume is Nm ³ / h |
|---|---|---|
| AS-DD215 | 1.0~5.0 | 8.0 |
| AS-DD270 | 1.5~8.0 | 11.0 |
| AS-DD350 | 2.0~12.0 | 15.0 |

If the aeration disc operates intermittently (nitrification / denitrification), only ensure that the pipeline system does not leak. However, if the aeration disc is closed for a long time, the corresponding preventive measures must be taken for the following situations:

- Silt deposition - use a separate mixing system
- Accumulation of condensate - gradually increase the gas volume when restarting
- Aeration discs are fouled - flush the aeration discs weekly, or run the aeration discs daily, or re-debug the aeration system before restarting.
- The aeration discs must be kept at a safe distance from the water accelerator (agitator, flow generator), and the water flow velocity at the aeration discs must not exceed 0.5m/s.
- Damage caused by unforeseen accidents is not covered by our warranty.

# 8. Troubleshooting

### 8.1. General recommendations

Due to the use of high-performance materials, AquaSust° aeration discs hardly require maintenance even after long-term use. AquaSust strongly recommends regular inspections every 12 to 15 months to monitor deviations from expected performance. Accurate pressure gauge should be monitored, and an increase of pressure loss of more than 20 mbar may indicate diaphragm scaling or other problems.

### 8.2. Common faults and handling methods:

**Phenomenon 1: Too large air flow in local areas**

● Possible cause 1: Air branch leakage

Method 1: lower the water level in the pool, enter the problem area, keep the medium gas operation, check the pipe joints and pipes for signs of damage, repair or replace the damaged parts.

● Possible cause 2: Aeration disc diaphragm is damaged or detached

Method 2: lower the water level in the pool, enter the problem area, keep the medium gas volume operation, visually inspect the aeration disc, and replace the aeration disc.

**Phenomenon 2: uneven aeration**

● Possible reason 1: insufficient blower capacity

Method 1: Ensure that the blower is working normally and open another blower.

● Possible cause 2: valve closure (or partial closure of the intake riser). Method 2: Check the position of butterfly valve and open when necessary.

● Possible reason 3: uneven air distribution of the exposed disc

Method 3: lower the water level in the pool, enter the problem area, check the horizontal flatness of the aeration disc, adjust the tolerance to ± 10 mm, and check the pipe and joint are

If there is any blockage caused by debris, clean it with air or water.

● Possible reason 4: sediment on the aeration disc diaphragm

Method 4: Check whether there is sediment and scale on the aeration disc diaphragm, and clean or replace the aeration disc as needed.

**Phenomenon 3: decreased dissolved oxygen or increased system resistance loss**

● Possible cause: sediment on the aeration disc diaphragm

Method: Check whether there is sediment and scale on the aeration disc diaphragm, and clean or replace the aeration disc as needed.

**Phenomenon 4: an uneven distribution of dissolved oxygen occurs throughout the pool**

● Possible reason 1: Insufficient air volume

Method: confirm that the blower works normally and turn on another blower. Check the equipment and working status.

● In addition, the design defects of the aeration tank itself (such as inadequate mixing) may lead to unexpected problems. If necessary, contact the contractor, designer and AquaSust to analyze the problem.

# 9. Maintenance and cleaning

### 9.1. Maintenance

Continuously monitoring aeration during routine operation and sometimes finding uneven aeration and higher than expected pressure loss. According to the type of wastewater, treatment process and operation conditions, if the diaphragm scaling phenomenon occurs, the oxygen transfer efficiency of the aeration disc will be reduced, so the sediment on the diaphragm should be removed regularly. In the process of cleaning, the sludge on the diaphragm should be prevented from drying out. Once the sludge dries out, it will stick to the diaphragm and may permanently block the aeration disc.

### 9.2. Mechanical cleaning

Remove the deposits from the diaphragm with a good home scrubber: just scrub gently and rinse with plenty of water. If necessary, use a high pressure water washer (follow the manufacturers safety guidelines for the high pressure water cleaner), but must ensure that the nozzle distance from the diaphragm is about 50 cm and set the nozzle to wide spray instead of spray. It is recommended to use a high-pressure washer to remove the scaling produced by aluminum salts and iron salts. The chemicals themselves do not erode the diaphragm surface, but may sometimes cause additional scaling.

### 9.3. Chemical cleaning

Formic acid is a dangerous chemical that may cause serious injury and death. Specifically trained personnel need to use professional equipment for cleaning. All safety instructions and recommendations must be followed for formic acid use.

Certain deposits such as calcium carbonate ($CaCO_3$) can be removed by normal operation (shutdown) by adding formic acid (HCOOH) to the air flow. According to the degree of scaling, the amount of formic acid was prepared by the standard of spraying 10 mL of formic acid (85% concentration) in 1 $Nm^3$ air (20℃, one atmospheric pressure), and the pickling time was about 30 to 60 minutes. Set the air volume to the maximum design flow of the exposed disc (see Section 7 Data Table 1 for details). This maximum designed gas volume is run for an additional 2 hours to remove formic acid remaining in the pipe and aeration tray. The exact amount of formic acid used and cleaning details must be determined by appropriate testing and follow the corresponding instructions for use.

# 10. Replace

If necessary, the whole aeration disc shall be replaced. Replacing a diaphragm usually requires special disassembly tools and takes more time, so it is usually more economical to replace a new aeration disc.

- Use a high-pressure water gun to remove the surface sludge of the aeration disc;
- Unscrew the aeration disc and the adapter;
- Do not damage the opening hole on the cloth air branch pipe;
- Clean the sealing area.
- Install new adapters and aeration discs as described in Section 3;
- Conduct the leak testing as described in Section 4.

# 11. Oxygen transfer efficiency testing in clean water

Oxygen transfer efficiency tests can be used to determine the performance of the aeration system. The test must meet the standard DWA-M 209 or DIN EN 12255-15 and / or ASCE / EWRI 2-06. All details of these tests are agreed in writing by both parties at the latest. You must ensure that the air disc has been running in clean water for at least 2 weeks before starting oxygen transfer testing. Use only tap water for water testing, any other type of water see advice provided by DWA. If algae grows, please drain the water in the pool, clean the aeration disc and aeration tank and inject tap water into the pool.

# 12. Packaging, transportation, and storage

### 12.1. General recommendations

The AquaSust diaphragm air exposure disc must always be protected from weathering (rainstorm, hail, freezing, overheating, direct sunlight, etc.) and continuous mechanical effects. The storage conditions must meet the requirements of the standard DIN 7716 or ISO 2230. Poor storage conditions and improper handling may reduce the service life and performance of the exposed discs.

### 12.2. Packaging and transportation

The aeration tray and replacement parts can only be stored and shipped in the original packaging. The aeration disc is guaranteed only in its original and complete packaging. Do not stack the original packaging cards, even if they are temporary. Ensure that the goods are properly fixed during transportation. Do not expose the discs to harsh weather conditions.

### 12.3. Storage conditions

Place, temperature, humidity, lighting, UV, and ozone

- Store equipment and aeration discs and all accessories in dry, ventilated rooms from DIN 7716 to + 5℃ to + 25℃ according to DIN 7716 or ISO 2230 standards. Higher or lower temperatures, please consult with AquaSust.
- The relative humidity must be lower than 65%. Do not use a wet storage room.
- Keep away from the heat source to avoid overheating (above 25℃).
- Avoid product frosting, overheating, direct sunlight, ultraviolet light lamp (fluorescent tube) exposure, avoid contact with dust, mineral oil, solvents and hydrocarbons.
- Do not store the product near the electric motor, especially the blower. The ozone generated by the electric spark is harmful to the rubber products.

Do not store the product outdoors. The storage time before installation / start and operation shall not exceed one year. For other considerations, please consult AquaSust.

# 13. Recirculation

Local regulations on waste storage or waste metal should be considered, and the decisive role is to follow effective laws and regulations on waste recycling and relevant environmental protection requirements.
If our products are not contaminated with other materials, there is no need to care about the special monitoring of the waste. In the case of pollution, please ask your competent authorities.

# 14. Disclaimer

The above information is based on our existing knowledge, and it aims to make general comments for our products and their applications. Therefore, there is no commitment to the specific performance or domain-specific adaptability of the product. We comply with existing industrial property laws and provide quality assurance for products under standard sales conditions.

# AquaSust Fine Bubble Disc Diffuser Comparison

**1.Aquasust disc diffuser vs well-known usa disc diffuser**


https://youtube.com/shorts/TU80hturlAg?feature=share

**2. Aquasust disc diffuser vs china other disc dfifuser**


https://youtube.com/shorts/q5APLADS4QY?feature=share

**Hangzhou AquaSust Water Technology Co., Ltd.**
Office Address: #2808, Baiyue Center, Linping, Hangzhou, Zhejiang, China
Postcode:311100
M.T:+8615267462807
Tel:0571 892863779
Kate@AquaSust.com
www.aquasust.com
www.aquasustfactory.com