AQUANOMICS 4 INCH MEMBRANE HOUSINGS
USER'S GUIDE

Guidelines & Information incorporated in this User's Guide are intended only as a supplement to good industrial practices. The guide should be used in combination with Engineering Drawing of respective membrane housing model used.

PRODUCT INFORMATION

AQUANIMICS fiberglass membrane housings are designed for continuous, long term use as housings for membrane filtration. AQUANOMICS membrane housings are designed for different pressure ratings which are used to treat tap, brackish & sea waters. Any standard 4 Inch nominal diameter & 40 Inch long spiral wound membrane will be accommodated in AQUANOMICS membrane housing. Membrane interface adapters required in case of female membranes will be supplied with the housing.

MATERIAL RECEIPT

On receipt, ensure that all the material is received as per ordered qty & in good condition. For any shortages in receipt, intimate the supplier within the stipulated time to void the warranty & in case of transit damages, intimate the concerned insurance agency.

HANDLING

Membrane housing shell is made of fiberglass & any impact, scratches or mishandling during unloading / loading will reduce the life or make the membrane housing unfit for usage. Ensure that membrane housing packing is intact till the installation.

INSTALLATION

Ensure that the installation engineer reads the user guide in detail, before installation. In case of any difficulty, contact the nearest AQUANOMICS representative.
Good industry practices & plumbing / piping codes have to be followed during installation, operation & maintenance in order to assure safe, optimum & long service life of membrane housing. Improper installation can result to catastrophic failure & may result in severe bodily harm or property damage.

Quick Checks

- Polyurethane or rubber saddles should be used as an interface between the membrane housing shell & skids / frame.
- Under pressure, membrane housing must be free to expand. Ensure that flexible fittings & couplings are used to allow expansion.
- Vessel must not be subjected to excessive stress caused by bending moments.
- Vessel ports & components should not be used to support piping manifolds or any other components.

WATER LEAKS

Any water leaks from vessel / piping during installation / commissioning should be arrested immediately in order to keep the end plugs & retaining rings clean, dry & free from corrosion. Failure to do so can lead to catastrophic failure & may result in severe bodily harm or property damage.

SPECIAL REQUIREMENT

AQUANOMICS provides engineering assistance in selecting appropriate membrane housing & specialty steel for specific applications. Get in touch with your nearest AQUANOMICS representative. However, the final determination including the evaluation of the construction materials for use in specific environment will be the responsibility of the purchaser.

PRECAUTIONS

For safer & better service life of membrane housing, follow all the precautionary instructions given below. Failure to do so will void the warranty.

Mounting:-

- Mount the membrane housing centered on horizontal members spaced at recommended span (s) using compliant mounting hardware furnished.
- Tighten the straps – maximum one ft-lb.

Piping:-

- Use flexible piping / victaulic couplings for permeate & feed / concentrate connections.
- Hanging piping manifolds or supporting other components with the membrane housing may result in damaging of membrane housing.
- Permeate port is made of Engineering Plastic & Tightening the permeate port more than one turn past hand tight will damage the port.

Overpressure Protection:-

Provide overpressure protection for membrane housing set at not more than 105% design operating pressure.

Inspection:-

Inspect end closures regularly, replace deteriorated components and correct causes of deterioration.

Servicing:-

Relieve system pressure before working on the membrane housing. Working on system under pressure may result in severe bodily harm or property damage.

Before Start – Up:-

Ensure that the retaining ring is in place and fully seated in the groove.

Pressures:-

- Operating the vessel in excess of the ratings, will shorten the life & may result in severe bodily harm or property damage.
- Engineering permeate port are designed to operate at 125psi, operating at pressure in excess of 125psi must be approved by factory.

- Membrane Housings are not designed for VACUUM conditions; operate only in positive pressure applications.

pH Operation:-

Membrane Housings are designed for continuous operation at a pH of 3 – 11 & for intermittent cleaning pH 2 – 12 for less than 30 minutes.

STOPPAGE:-

Some feed waters may cause corrosion under static condition, in order to prevent the system from corrosion, it is recommended to flush the system with permeate water.

ENGINEERING

Ensure that the operator / Engineer who carries out the servicing / maintenance schedule has good knowledge of plumbing, hydraulics, membranes, water treatment & good industry practices.

REMOVING THE END PLUG

Step – 1

Relieve the membrane housing of system pressure.

Step – 2

Disconnect the feed / concentrate & permeate piping. Mark identification on the piping assembly for easy re-assembly.

Step – 3

Remove all contaminants & foreign matter from end margin of the membrane housing, using a scotch-brite, sand paper or brush. Any contaminants interfering with the end plug removal will damage the end plug or I.D of membrane housing.

Step – 4

Remove the retaining ring out of the shell / insert ring groove. Continue removing the ring by running your finger behind the ring & carefully pulling the ring from the groove. Take care not to get the finger injured.

In case if it is difficult to remove the retaining ring due to prolong use, in such case lightly tap the end plug using a plastic mallet or use any releasing spray for quick & easy removal.

Step – 5

Connect threaded Engineering Plastic nipple to the permeate port and gently rock the end plug up & down to release the end plug from the shell.

Repeat the above steps to remove the end plug from opposite side.

Step – 6

If the end plug is with adapter design, remove the adapter by slowly pulling on the adapter body.

CLOSING THE END PLUG

Step – 1

Check the bore of the membrane housing for any foreign matter or imperfections. Remove all the foreign matter using mild soap solution and rinse with clean water. For imperfections, using a 600 grit sand paper lightly sand the surface & clean with soap water & rinse with clean water.

Step – 2

Lubricate all the seals (pwt / adapter / head) using silicone based lubricant or commercially available glycerin. Apply a very thin layer of lubricant on the seal area of the membrane housing I.D for ease in closing the end plug.

Note: Check with your membrane supplier before using the lubricants as they can foul the membranes.

Step – 3

If the end plug is with adapter design, insert the adapter in the end plug by slowly pushing in the permeate port tube. Holding the end plug square to the axis of the shell, slowly push the end plug into the shell until the retaining ring groove is clearly visible.

Step – 4

Place the end of the retaining ring in the groove of the shell / insert ring & continue pushing the ring counter-clockwise till the ring completely seats into the groove.

Step – 5

Reconnect the feed / concentrate & permeate piping.

Step – 6

Double check the assembling of end plugs, retaining ring seating in the groove, piping connections etc before pressurizing the system. Take all the necessary safety precautions before start-up.

Step – 7

Do not tolerate any leaks. Leaks can lead to corrosion that can lead to component deterioration & eventually catastrophic failure.

MEMBRANE LOADING / UN–LOADING

Note: Procedure described below is only for information purpose. Membranes should be loaded / un-loaded according to the membrane manufacturer's instructions. If membranes are not installed properly, malfunctioning of system / membrane damage may occur.

Step 1 – As described in End Plug removal section, remove the End Plugs.

Step 2 – For unloading the membranes, push the membranes out of the vessel from the upstream end (feed end).

Note: Membranes are always removed & installed in the direction of feed flow.

Step 3 – While loading the membrane, ensure that the membrane housing bore & membrane outer surface is perfectly clean & contamination free.

Step 4 – Lubricate the seals as per manufacturer's recommendations.

Step 5 – Reinstall the end plug on the down stream end as described in End Plug Closing section.

Step 6 – Load the membrane with the brine seal (typically a U-cup seal) installed on the up-stream end with its lip facing up-stream.

Step 7 – Push the membrane in the housing until the membrane fully engages with the head on the down stream end.
Step 8 – Once membrane is loaded, close the end plug on the up-stream end.

INSPECTION & OVERHAUL

Once the end plug is removed, dismantle the end plug & separate all the components. Clean all the components with soap water, scotch brite & rinse with clean water. Inspect all the components & shell for any corrosion, dents, cracking, softening, discoloring, imperfection, scratches etc.

Plastic (Engineering Thermoplastic) Components:-

- Cracks & Chip-Off – Replace the components.
- Softening & Dis-Coloring – Can be due to chemical attack, replace the components, if problem continuous check for alternate material.
- Damaged Threads – Replace the components.

Metal Components:-

- Dents & Sharp Edges – Using sand paper polish the damaged area, if the problem can be rectified use it or else replace the components.
- Corrosion – Can be due to non compatibility of water & metal composition or due to chemical attack. Replace the components & if the corrosion continuous check with factory for alternate material.

Shell:-

- Check the bore of the membrane housing for any foreign matter or imperfections. Remove all the foreign matter using mild soap solution and rinse with clean water. For imperfections, using a 600 grit sand paper lightly sand the surface & clean with soap water & rinse with clean water.

Note:-

- *If any component cannot be restored to working /as new condition, replace the parts.*
- *Use of damaged components can lead to catastrophic failure.*
- *Every time the vessel is serviced, replace used seals with new ones.*

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