

AME AERATION SYSTEMS

fine-bubble and medium-bubble aeration diffusers with a flexible membrane

Are you operating an older waste water treatment plant and are you thinking about its operation economy? Do you need to reduce its power demands?

The intensification and the modernisation cannot be done without an intervention to the activation tank and its equipment with a fine-bubble aeration system.

Are you faced with a decision of constructing a new waste water treatment plant?

The solution will be similar. A fine-bubble aeration system, particularly with membrane aeration diffusers, is currently the most widespread system used in waste water treatment plants.

Aeration system

The FORTEX aeration systems rank among the most modern systems developed by the joint stock company FORTEX – AGS, a. s. Šumperk. Their mark and technical solutions are patent protected.

They are designed for the stirring and aeration of water in activation and degassing tanks of waste water treatment plants or for the aeration of other liquids, for the aeration of fish breeding plants, ponds and reservoirs or for the pneumatic flotation.

The aeration system is dimensioned according to the selected technology, the required quantity of oxygen or tank stirring requirements, the required overpressure, the method of regulation and the shape and the type of tanks.

The aeration system consists of a source of compressed air, a supply piping and fittings, a distribution piping of aeration diffusers, aeration elements and a dewatering system of the grate. The systems are always designed from modular elements on an individual basis for each project.



1) Sources of compressed air

The sources of compressed air include rotary blowers working on the principle of Roots' rotary pistons, turbo blowers and membrane blowers structurally suitable for oil-free air pressuring and transport or high-pressure blowers. The source of compressed air is individual to the particular plants and must be fitted with a filter preventing the penetration of impurities into the aeration system of the discharged water.

2) Supply piping and fittings

The supply piping of compressed air starts at the delivery piping of the source of compressed air and ends in the treatment plant tank usually 1 – 1.5 m below the water level. A regulation and shutting flap is placed in the piping, on the tank edge. The supply piping may be usually made from several kinds of material, such as polypropylene or stainless steel. It is also possible to use a piping from structural steel (e.g. in the case of reconstructions). In this case, it is necessary to fit the end of this piping with an air filter preventing the penetration of solid particles into the aeration diffusers. From the air filter, it is necessary to continue with a piping made from stainless materials. In smaller treatment plants, the supply piping is made from stainless steel. Other materials may be used in the system after a consultation with the supplier.

3) Distribution piping of aeration diffusers

The distribution piping of aeration diffusers serves for homogenous distribution of air to different rows of aeration diffusers, supplies them with air and simultaneously acts as a supporting part. Pipes of the grate are connected by mutually connected sleeves. The grate is connected to the supply pipe with a rotary flange of an inner diameter appropriate to the pipe. When plastic material is used, the connecting flange of the pipe metal-plastic is about 1 to 1.5 m under the water level. In removable grates, the interconnection of the grate with the supply piping is by a PVC or rubber hose and the connection to the piping is placed on the tank edge with the help of a plastic quick coupling.



4) Aeration diffusers and grate dewatering system

Both the fixed and the removable grates are made from polypropylene pipes and shaped pieces interconnected by polyfusion welding or, in special cases, from circular or four-square stainless sections. The shape and the dimensions of the grate may be adapted to the shape and the dimensions of the tank. The aeration diffusers are anchored to the bottom with the help of height adjustable supports to concrete loads or to stainless steel anchors embedded in the tank bottom. In steel tanks, the grates are anchored to fixtures carrying the adjustable supports welded to the tank bottom. In polypropylene tanks, the anchoring is done by means of stainless steel bolts through polypropylene feet welded to the tank bottom. The supports enable a height levelling of the piping and the aeration elements to a horizontal plane and, at the same time, they enable the fixed or sliding (guiding) installation of the piping. The removable aeration grates are fixed by help of ropes through pulleys, by means of concrete loads or they are guided to the bottom with the help of a guide rod.

The water condensed in the system is led to the drain pit of the aeration grate. From the drain pit, the water is then led through piping ending with a valve above the tank water level. The drain piping is anchored to the tank wall.

In the aeration system, we recommend fitting the piping system with an electromagnetic valve which will open the system and cause a sudden pressure drop in the piping and a subsequent faster constriction of the membrane after an interruption of the air supply to the piping. In large treatment plants, it is advisable to mount more of these valves uniformly on several branches.

During the design phase, the manufacturer can provide a design of aeration grates. Further information is contained in the technical and delivery terms.

Aeration diffusers

The atmospheric air is aspirated by the source of compressed air through an air filter. From this place, it is driven through the distribution piping to the individual grates fitted with aeration diffusers. The air passes through these aeration diffusers to the liquid in the tank.

The aeration diffusers are fitted with a flexible membrane which swells under a certain pressure so that the perforation in the membrane opens and the air starts passing in form of fine or medium bubbles. After an interruption of the air supply, the rubber membrane in the fine-bubble system shrinks and the perforation is closed. In place of the inlet opening, the membrane is not perforated and serves as a backflow valve for covering the opening in case of an interruption in the air supply. AME-P has the openings permanently opened and a central flap covering the air inlet opening opens or closes depending on the rise or fall in pressure.

The aeration diffusers are fixed to the circular polypropylene piping by means of polypropylene threaded branches with the help of an insert (AME-D, AME-T) or a thread made directly on the aeration element body (AME-260, AME-P). To the stainless steel piping, the aeration diffusers are fixed by way of a sleeve welded on the stainless piping and then directly or with the help of a threaded insert. The same method is also used for the square section piping. To the circular piping from stainless steel, the aeration diffusers also may be fixed with a system of threaded branches used for the polypropylene piping.



For the aeration of activation tanks, it is possible to use the aeration diffusers AME-260, AME-D, AME-T750 (N), AME-T370 (N).

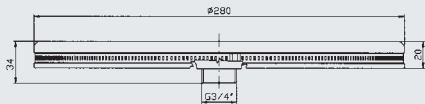
The aeration diffuser AME-260S is suitable for use in the aerobic sludge stabilisation, in accumulation and equalisation tanks, etc. The aeration diffuser AME-P is suitable for stirring mixtures in tanks, in sand catchers, in degassing zones, etc.

AME type		260	D	T750	T370	260S	P
Weight	(kg)	0,8	1,9	1,3	0,7	0,8	0,05
Pressure loss	(kPa)	1,8 – 3,7	2,4 – 4,5	4,0 – 5,6	4,0 – 5,6	1 – 2	1,2 – 4,0
Recommended air through-flow	(m ³ /h.pc)	3,5 – 4,0	7 – 10	5 – 6	2,5 – 3,5	5,5 – 6,5	4 – 10
Oxygen use E _a	(%/m)	3,8 – 8,0	4 – 7	3,5 – 8,0	3,5 – 8,0	2,5 – 4,5	1,7 – 2,2
Surface density of elements D _S	(pc/m ²)	0,5 – 4,5	0,2 – 5,0	0,5 – 4,5	0,8 – 7,0	0,5 – 4,5	0,5 – 4,5

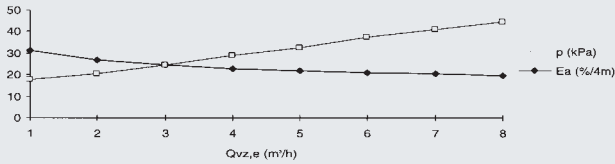
AME type		T90	T750PU	T370PU	T750SR	T370SR
Weight	(kg)	2,7	1,3	0,7	1,3	0,7
Pressure loss	(kPa)	3,5 – 4,5	3,0 – 5,5	3,0 – 5,5	3,0 – 5,4	3,0 – 5,4
Recommended air through-flow	(m ³ /h.pc)	6 – 12	5 – 6	2,5 – 3,5	5 – 6	2,5 – 3,5
Oxygen use E _a	(%/m)	3,5 – 8,0	3,5 – 8,0	3,5 – 8,0	3,5 – 8,0	3,5 – 8,0
Surface density of elements D _S	(pc/m ²)	0,5 – 4,0	0,5 – 4,5	0,8 – 7,0	0,5 – 4,5	0,8 – 7,0

AME - 260

The aeration element is mostly used for common sewage water. It is composed of a rubber perforated membrane fixed on a bearing disc by way of a stainless band with a clip. In the case of a drop in pressure, the membrane of AME – 260 closes the air inlet opening.

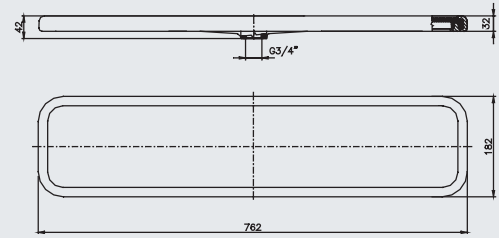


Characteristics of AME-260

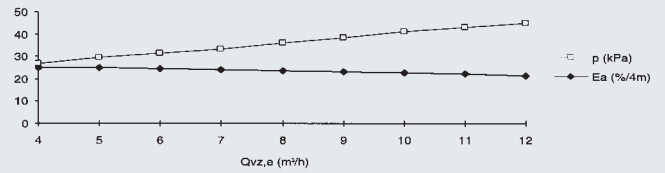


AME - D

The element AME–D is composed of a bearing plate on which a rubber perforated membrane is tightened with the help of a special offset, fixed by stainless steel angle sections by way of plastic fixtures. In the case of a drop in pressure, the membrane of AME–D closes the air inlet opening. It is mostly designed for the use in common sewage waste water.



Characteristics of AME-D



AME - T370, T750, T370PU, T750PU, T370SR, T750SR

The aeration elements consist of a perforated membrane which is fixed to a bearing tube by way of stainless fixing clips. AME–T750 and AME–T370 have different lengths. In case of a pressure drop, the membrane of AME–T closes the air inlet opening.

In the basic type, the membrane is made from EPDM rubber, the PU type contains a membrane of treated polyurethane, and the SR type contains a membrane of silicon rubber.

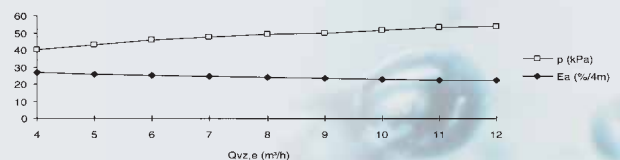
The aeration elements with membranes of EPDM rubber are mostly used for common sewage water, PU membranes are suitable for the use in waste water containing vegetable or animal fat, and SR membranes are suitable even for higher temperatures of waste water. The design of the membrane type for industrial waste water should always be based on consultation with the manufacturer.



AME - T750 (T370)



Characteristics of AME-T (1 m)



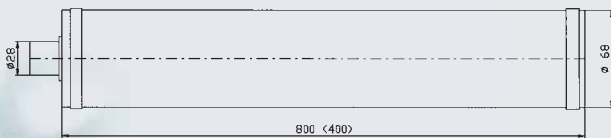


AME - T370N, T750N, T370PU N, T750PU N, T370SR N, T750SR N

AME-T750 N and T370 N continue the previous series of aeration diffusers, while their bearing body is made from stainless steel.

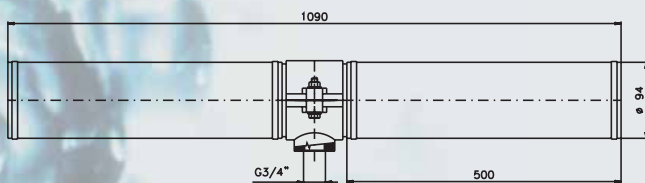
It is fixed to the air distribution piping with the help of a bar tightening a couple of aeration diffusers through a rubber sealing to sleeves welded on the stainless steel piping.

The diffuser parameters are identical to the types AME-T750 and T370. They are also manufactured with a membrane made from treated polyurethane or silicon rubber.



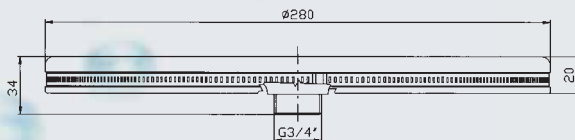
AME - T90

It consists of a perforated membrane which is fixed to the supporting pipe by means of stainless steel tightening clips. It is fixed to the air distribution piping with the help of insertions with 3/4" external threads and a thread branch.



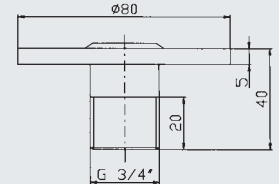
AME - 260S MEDIUM-BUBBLE

The aeration diffuser AME-260S is made from rubber perforated membrane fixed to a supporting disc by means of a stainless fixing band with a clip. In case of a pressure drop, its membrane closes the air inlet pening. It is mostly used in common sewage waste water for an aerobic sludge stabilisation, in accumulation and equalisation tanks.



AME - P ROUGH-BUBBLE

The perforated membrane of this diffuser is fixed to special offsets of the supporting polypropylene disc. The AME-P aeration diffuser is suitable for stirring mixtures in tanks, in catchers and in degassing zones.



Do you know the advantages of FORTEX aeration systems?

- high percentage of air oxygen use
- very low pressure loss
- quick and easy assembly, long service life
- resistance to the choking of elements
- power savings
- possibility of an intermittent operation and automatic control
- undemanding maintenance, minimal attendance demands
- simple exchange of the diffuser membrane
- suitable for all the shapes of tanks
- the company FORTEX-AGS, a.s. will advise on the optimum aeration system in the case of treatment plant reconstructions
- upon assignment, FORTEX-AGS, a. s. will process an offer so that the aeration system with the proposed diffusers would be the most convenient both for oxygen input and power consumption

