AquaCareFlotor

High End Flotation Technique

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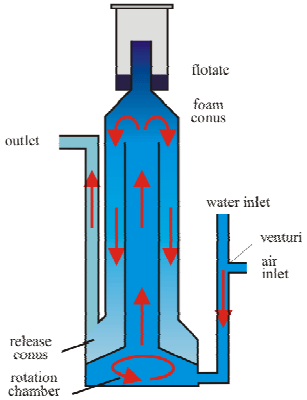
Why flotation?

In all marine systems wastes are continuously produced. Fishes secrete most of the food in form of ammonia/ammonium (= NHx), protein, amino acids and fibres. To prevent fish and other animals against toxic concentrations, these substances must be eliminated or changed into harmless material. With biological filtration almost every substance may be converted into carbon dioxide, water, nitrate, phosphate and sulphate - mineralization. But these products accumulate. With skimming or flotation proteins and some other substances are taken out of the system before the biological filtration works – even sand will be eliminated if the organic load is high (co-skimming). The raising of nitrate and phosphate lowers with skimming. The water has lower concentrations of biological oxidizing substances. So the redox (ORP) is higher and the animals grow better. If high concentrations of organic matter occur (death of an animal, too much food), a biological working filter reacts very slowly. Bacteria must adapt to the new input. Especially nitrifying bacteria *Nitrosomonas* and *Nitrobacter* need a long time to react to the new concentration. The flotation process reacts automatically and prevent a rising of toxic products like NHx and nitrite. By using a skimmer the conventional filter technique (sand filter, trickling filter, biological filter) may be laid out smaller. Investment (smaller filter), running costs (flushing water) and need space are minimized.

The principle of *suspended flow principle*



The process water is pumped through the injector that takes air into the water – model “A” have an air stone that takes air into the water and a static mixer for mixing. The air-water- mixture is injected at the lowest point of the skimmer into the rotation chamber. Here the system pressure is high to enable maximum gas change (oxygen input, carbon dioxide output). After a while the gas-water-mixture up flows the inner tube. There the organic loaded foam is created. A part of the bubbles goes downwards the main tube. In this tube the water stream downwards is as high as the velocity of the bubbles upwards. So the bubbles are caught for a long time - long contact time. At the bottom of the AquaCareFlotor the main tube enlarges to inhibit the bubble going out of the water outlet. The foam in the upper parts looses water and is pushed into the foam cup. With this system high amounts of organic loads will get out of process water.

Field of application

AquaCare® is building flotation systems from 0.2...610 m^3/h. The smaller units are available with two different air bubbles producing systems: version “V” is built with a venturi, version “A” with air stones. The field of application is hobby size sea water aquaria and labs. The medium and large models are exclusively equipped with venturi / injector and their field of application is:

aquaristic purpose:	Show size reef and shark tanks, dophinaria seal tanks
aqua culture systems:	fish breeding, shrimp farms, keeping of sea animals for scientific centers

Advantages of the suspended flow principle

starting with small units
for hobby size aquaria...

- extremely **long contact time** between the air and the sea water resulting in:
  - high enrichment with oxygen
  - strong formation of the carbon dioxide / hydrogen carbonate / carbonate buffer (alkalinity)
  - more even pH value
  - smaller than already available skimmer
  - low running costs (only one pump for injector and water flow)
- sensitive to protein concentrations (BSA) of as **low as 3 µg/l** (operation with ozone)
- **lowers** the numbers of free-swimming **bacteria** to about 20%
- **reduced ozone consumption** of about 75% compared to other skimmers, therefore reliable and cheap operation
- with ozonization, the protein skimming **efficiency is raised** by 30%
- **low production** of ammonia / ammonium, nitrite and nitrate
- obtainable as **external** module or for **immersion** in the tank

Features of the AquaCareFlotor

... till large size units for aqua culture
and show size tanks...

... and type made of extreme rigid
PE versions.

- reduced size
- maintenance is more easy
- bigger units are available ● 0.2...420 m^3/h water flow
- optimised injector with a working pressure of 1 to 2 bar creates smaller bubbles
  ● large turbulence zone
  ● enlarges efficiency and power
  ● any chalk creation (up to 10°dKH at 25°C)
  ● high air inlet pressure and flow
- magnetic coupled pump
  ● any leakage possible
  ● low heat input (important for cold systems)
- *build in accessories (models 6000V and larger)*: ● air flow meter ● flushing system in foam cup ● ozone connector ● angle seat valve for air input ● angle seat valve or butterfly valve with hand gear for water regulation● additional connector for units like chalk reactors, nitrate filter (systems that need small water volume at high pressures) ● connector for ORP (redox) probes ● it is possible to demount the injector ● recycling of the used exhaust air that contains ozone (not model ACF6000V)
- *Options*: ● activated carbon filter for air input ● activated carbon filter for destroying ozone in the air outlet ● de-aeration chamber for bubble free outlet water ● flow meter for water inlet (mechanical or electronical) ● cycling of the skimmer water (model "C") for extreme loaded water or for bacteria elimination ● insulation (model "I") for extreme cold water systems ● ORP control for automatic dosing of ozone ● automatically floating control with PLC● recycling of rest ozone in exhaust air (larger than ACF 6000V)

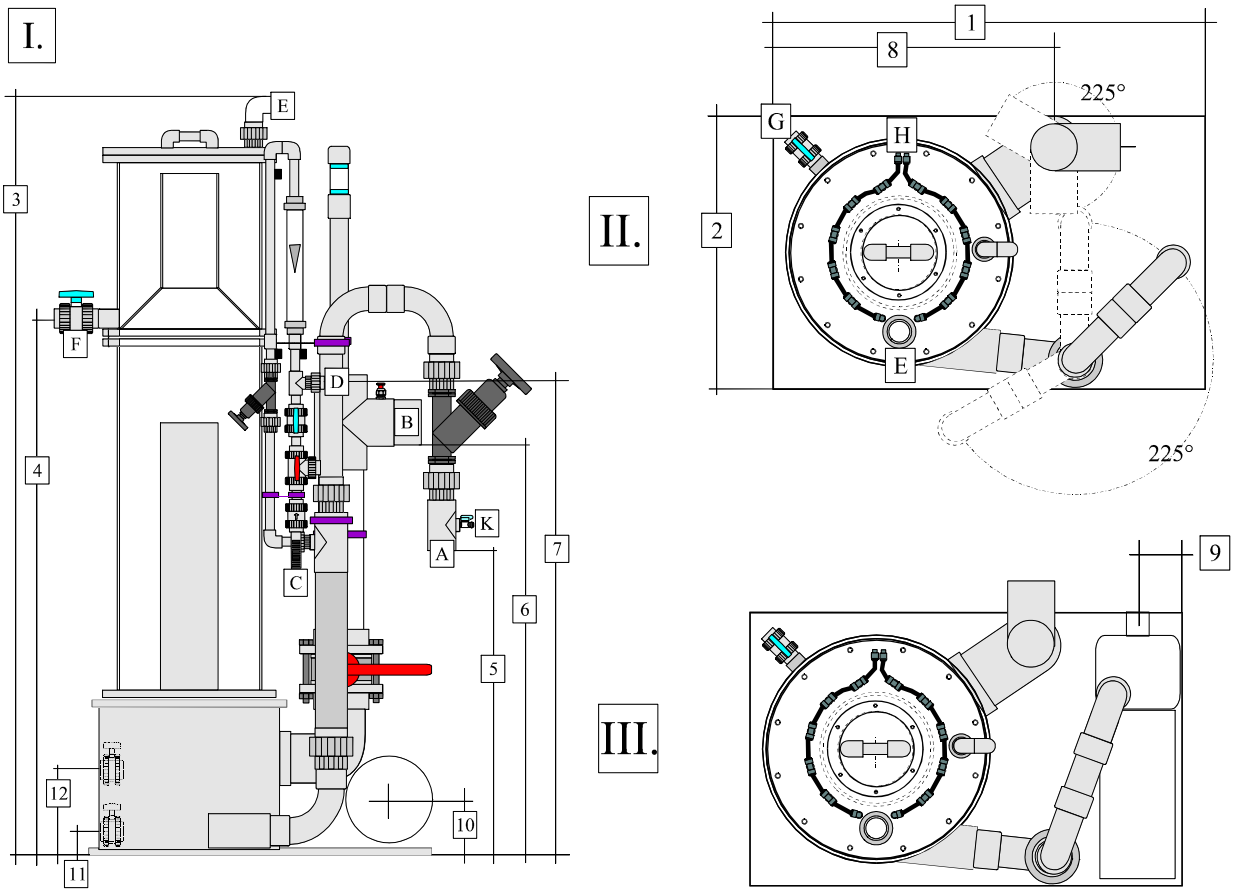
Technical data of the AquaCareFlotors ACF 6.000V...ACF 630.000V

***AquaCareFlotor* size**	**6,000 V**	**16,000 V**	**30,000 V**	**50,000 V**	**70,000 V**	**110,000 V**	**170,000 V**	**240,000 V**	**480,000 V**	**630,000 V**
Order number	354-020	354-030	354-040	354-050	354-065	354-080	354-100	354-120	354-120	354-190
Water flow, ca. m^3/h	4	11	20	33	50	75	110	160	330	420
Water flow type „C“, ca. m^3/h	0.6	1.6	3	5	7	11	17	24	48	63
Air flow, ca. m^3/h	1.3	3.6	7	11	16	25	35	53	110	140
Ozone consumption*, g/h	0.12...0.6	0.32...1.6	0.6...3.0	1.0...5.0	1.5...7.7	2.2...11.0	3.5...17.5	4.7...23.5	10...50	12...63
Ozone consumption* type „C“,	5	13	25	40	65	90	150	200	420	530
Total height, m	1.8	1.9	2.1	2.3	2.4	2.8	3.1	3.9	4.0	4.4
Foot print size L×W, m**	0.49×0.36	0.75×0.5	0.95×0.6	0.95×0.8	1.3×0.9	1.5×1.1	1.8×1.4	2.1×1.6	2.9×2.1	3.0×2.4
Diameter main tube, mm	200	300	400	500	650	800	1.000	1.200	1.600	1.900
Water volume, m^3	0.04	0.12	0.17	0.33	0.58	1.2	2.2	3.2	6.8	10.7
Contact time water, min	0.53	0.6	0.6	0.7	0.7	1.2	1.1	1.2	1.3	1.5
Contact time air, min	larger than 10									
Material main tube	PMMA (acrylic glass)				PE HWST black with porthole					
Material skimmer cup	PMMA (acrylic glass)				PVC transparent (PE on request)					
Material basis	PMMA	PVC grey	PMMA	PE HWST black						
Material flange sealing	NBR 70	silikone 60								
Material flange screws	Polyamide (corrosion resistant)				VA with stainless steel nuts inside the basis material					
Inlet injector	d40, DN32	d50, DN40	d63, DN50	d63, DN50	d75, DN65	d90, DN85	d125, DN110	d140, DN125	d200, DN180	d200, DN180
Outlet skimmer	d63, DN50	d90, DN85	d126, DN110	d110, DN100	d140, DN125	d160, DN150	d200, DN180	d225, DN200	d315, DN300	d315, DN300
Height of outlet, m	0.83	1.1	1.1	0.94	1.1	1.5	1.7	1.8	2.1	2.7
Drain skimmer cup	d20, DN15	d20, DN15	d40, DN32	d32, DN25	d40, DN32	d50, DN40	d50, DN40	d63, DN50	d63, DN50	d63, DN50
Drain basis	DN16	d20, DN15	d25, DN20	d40, DN32	d40, DN32	d50, DN40	d50, DN40	d50, DN40	d50, DN40	d50, DN40
Connector exhaust air	d25, DN20	d32, DN25	d40, DN32	d40, DN32	d50, DN40	d63, DN50	d75, DN65	d90, DN85	d125, DN110	d140, DN125
Connector ozone	d20, DN15	d20, DN15	d25, DN20	d25, DN20	d32, DN25	d32, DN25	d40, DN32	d40, DN32	d50, DN40	d63, DN50
Numbers of flushing nozzles	6	8	12	12	16	18	20	32	6	6
Flush. water flow, 4 bar, m^3/h	0.18	0.24	0.36	0.36	0.48	0.54	0.60	0.96	2	2
Connector for flushing	d6 PE	d10 (PE pressure hose)						PVC d20		
Operation temperature	2...35°C									
Weight empty in kg	23	52	95	100	180	260	430	520	600	700
Weight operation in t	0.06	0.17	0.27	0.4	0.76	1.46	2.63	3.72	10.1	12
min. water inlet, m^3/h (bar)	4 (1,2)	11 (1,2)	20 (2.0)	33 (2.0)	50 (2.0)	75 (2.0)	110 (2.0)	160 (2.0)	330 (2.0)	420 (2.0)
Suitable pump***	MX400	MX401	MX403	MDM40-150	MDM40-150	MDM50-150	MDE125-220	MDE125-240	KR150-250	
Electrical connection, kW	0.37	0.75	2.2	5.5	5.5	11	11	15	30	
Weight pump in kg	12	14	24	105	105	105	360	380	230	
Alternative pump***	KR-25-95-95	KR-40-125-95	KR-40-125-130	KR-40-160-130	KR-65-250	KR-80-250-265-4	KR-100-250	KR-100-250	KR150-250-3006	KR150-250-437635
Electrical connection, kW	0,37	1,1	2,2	4	5,5	7,5	11	18,5	30	37
Typical consumption									21 (45 Hz)	

* the ozone consumption depends extremely on the organic load of the water. The specification of type „C“ are made if the skimmer is used for disinfection purposes. (ca. 700 mV).
** we can build the pump on the mounting plate; without the footprint size will be smaller (on request)
*** MX, MDM, MDE and MDR are IWAKI pumps (if ordered); KR are ARBO pumps (if ordered)
You can transport all size up to ACF 630000V within standard 20' or 40 'container; technical data of smaller system (water flow 240...2000 l/h) on request

Dimension sheet of AquaCareFlotor
ACF6.000V...ACF480.000V

I. frontal view – II. top view without pump – III. top view with pump



all dimensions in mm	6.000V	16.000V	30.000V	50.000V	70.000V	110.000V	170.000V	240.000V	480.000V
1 length of mounting plate	490	750	950	950	1300	1500	1800	2100	2900
2 wide of mounting plate	360	500	600	800	900	1100	1400	1600	2100
3 total height	< 1600	< 2000	< 2100	< 2100	< 2400	< 2700	< 3100	< 3900	< 4000
4 height of cup drain „F“, ca.	1230	1430	1470	1500	1545	1860	2160	2450	2900
5 height water inlet „A“, ca.	620	375	850	600	880	1040	1600	1800	1170
6 height water outlet „B“, ca.	830	1100	1100	940	1100	1600	1600	1900	2100
7 height ozone inlet „D“, ca.	1150	1290	1340	1420	1495	1690	1690	1730	2100
8 side distance of outlet „B“, ca.	409	500	620	830	870	1170	1430	1650	2100
11 height lower drain „G“	on the	47	on the	0	85	90	85	80	80
12 height upper drain „G“	base plate	210	base plate	145	290	380	455	470	610

Modifications possible – data are only for rough planning