Catalogue
Sea Water Aquaristics

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Version: August 2022, 128 pages

Sea Water-
Complete Aquaria

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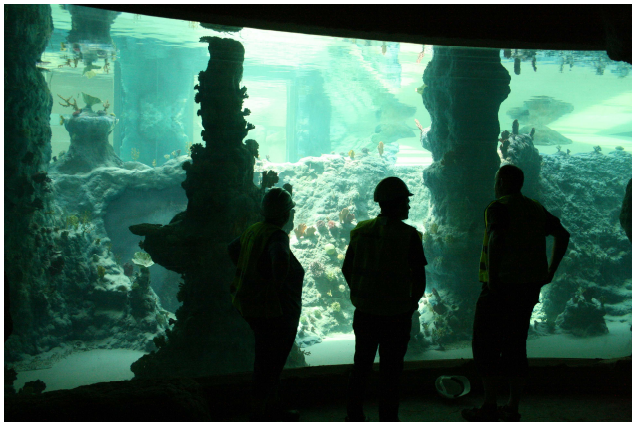
AquaCare also offers complete seawater systems at the highest level:
As a matter of principle, only components of the highest quality and state-of-the-art technology are used. You can benefit from our experience in large-scale plant construction and research. AquaCare systems are characterised by the following points:

- Glass aquarium with **black silicone glue** and diamond-cut panes; inner edges covered with glass strips;
  alternatively aquariums made of **acrylic glass** (Plexiglass)
- **Overflow chamber** with holes for drain, overflow, inlet; filled with noise absorbing material
- **Aquarium** underlay made of plastic
- Base cabinet with **modern plastic surface**, incl. gravel and screen frame
- **Filter basin *Basic*** with inlet chamber, degassing chamber and sediment chamber, holder for sensors of measurement technology, sock filter, heating holder
- **High-performance skimmer *AquaCareFlotor*** with particularly long contact time;
- Models with injector, wooden air stones and needle wheel are available;
  low and high models tailor-made for the respective purpose
- Circulation pump (return pump) of the latest generation (**energy-saving pumps**)
- Complete **PVC piping** with connection options for additional equipment, professionally finished, with lettering
- Adjustable **flow pumps** or alternatively **closed-loop** system
- Control heater made of glass or titanium; cooling unit if required
- Sockets for each device with lettering and **professional cable laying**
- **reef ceramics** or **living stone**,
- Sea water and 1 set of AquaCare care products

- **Service:** on-site installation (within 50 km of AquaCare), complete installation, filling with seawater and living stones, trial operation and detailed instruction

In addition to the standard technology listed above, further components are possible:

- Fleece filter
- *Turbo*-Chalk Reactor
- "Kalkwasserreaktor"
- Nitrate filter
- Phosphate adsorber
- Reverse osmosis
- Dosing units
- Plankton units
- Measurement and control technology from simple aquaristic computers to industrial PLCs including visualization and remote data retrieval



We would be pleased to make you an offer according to your ideas.

- from 300 litres in ANY size and equipment! -

Filtersystem *Basic*

- the complete technology in one piece -

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Filter system *Basic* 50 made of acrylic glass (Plexiglas) in the basic configuration with Inlet chamber, sock filter, heater holder, degassing chamber, float valve and hose holder

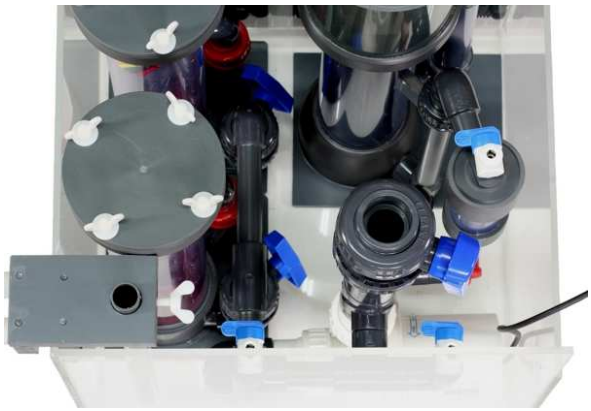
Basic 70 filter system with exemplary filter technology: heater, measuring chains for pH and ORP, skimmer ACF300A, 2 × empty filter MF_2-50, energy-saving pump for quiet operation and economical use

Advantage

Everyone knows the chaos in aquarium technology: the poor example (right) shows different systems, confusing assembly, poor maintenance possibilities, high risk of leaks and salt crusts wherever you look.

The *Basic* filter system is a safe solution for storing all aquarium equipment. The system is also more reliable for the future because there are enough junctions available for expansion technology. All systems within the Basic Filter are protected against overflow because leaking water remains in the system.

The AquaCare Filter Systems *Basic* can also be manufactured according to your wishes and for very large aquariums we build professional systems made of PE - we of course advise you, so that you can participate in our knowledge.



Structure of the system

1.+2. chamber with holders for heating and measuring sensors, overflow screen for degassing stage, inlet from skimmer

The Basic system is made of acrylic glass and provides high stability - even earthquakes cannot lead to breakage. The risk of ageing of the silicone seams in glass pools is also eliminated.

1. The aquarium effluent flows first into the inlet stage, which can be equipped with heaters, measuring sensors and pre-filtration. This chamber is always filled with water - even if the circulation pump fails, for example to avoid damage to the heating system and to protect the sensors of the measuring and control technology from drying out.

2. The water then flows into the degassing chamber, where excess gases are drawn out of the water. If the filtration water is not degassed, unsightly air bubbles can be created by the return pump and cloud the view in the aquarium. The water from the high-outlet skimmer should also flow into this chamber (discuss the necessary connection with us) to minimize discharge noise.

3. The water then enters the multi-purpose chamber. Filters can be used here as desired. The return pump is also here, which transports the water back into the aquarium. Automatic refills (by means of float switch or float valve) should be installed in this chamber. Additional filters such as MF2 multifunction filter, PMF phosphate adsorber, FBF fluidized bed filter, AK activated carbon filter, POC filter, globuli filter, KWR lime water reactor, ADN nitrate filter and fish drip chambers (acclimatization chamber) can be installed here.

Expansion possibilities

The *Basic* filter system can be extended with other filters at any time. AquaCare offers skimmers ACF, trickling filter TKF, denitrification filter (nitrate filter) ADN, POC filter (pellet filter), lime water reactors KWR, with CO_2-operated *Turbo* chalk reactors, fluidized bed reactors FBR, phosphate filter, activated carbon filter, heaters and much more. We will be happy to advise you which technology is appropriate for your planned aquarium. Whether pure fish aquarium, colorful reef basin, stone coral system, jellyfish installation, beach or rock biotope, AquaCare gladly selects the suitable technology for you.

Special requests

Since the *Basic* filter system is not a mass-made product and each basin is individually manufactured in Germany, special requests are possible at any time. Whether dimensions, connections, additional compartments (refuge, algae filter, quarantine department, drip basins for new fish or even special installations - we make it possible.

Technical data (an adaptation to your space conditions is possible)

Type	***Basic* 50**	***Basic* 70**	***Basic* 90**	***Basic* 140**	***Basic* 210**
Maximum aquarium size in l *	200	300	400	600	1000
Footprint size L × T × H in cm	50 × 26 × 40	65 × 26 × 40	65 × 36 × 40	75 × 46 × 40	95 × 56 × 40
Total volulme in l	35	68	93	140	210
Equipment	Prefilter ("filter sock"), MediaCup, holder for heating and measuring sensors, degassing stage filled with PE material, float valve with bracket				
Degassing chamber volume in l	3.8	11	14	19	20
Volume 3. Kammer*, approx. in l	24	26	36	57	130
Materials	PMMA (Acrylic glass), PE, PVC, PS, PA, NBR				

* This information is to be seen only as a guide value; the depth of the tank, circulation volume [illegible] sign of the overflow in the aquarium are decisive.

Filtersystem *Basic*
- useful accessories -

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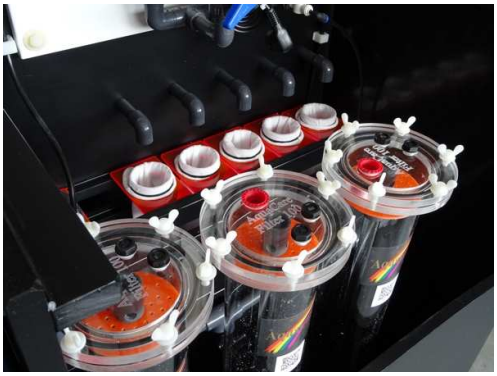
Acclimatization chamber:
This simple but very practical acclimation chamber is designed for the *Basic* filter system. It is placed on the degassing chamber (not possible with *Basic* 50) of the Basic system and provided with a water connection. - The chamber can also be placed on straight surfaces next to or above an aquarium. Inlet, overflow and emergency drain can be equipped with hoses.
Fish or other sensitive animals that need to be acclimated slowly are placed in the acclimation chamber with the contents of the transport bag and the water supply is adjusted drop by drop. When the maximum water level is reached, the water runs down through the overflow into the degassing chamber or is discarded.

Filter sock for the Basic filter system

Filter socks:
Acrylic glass pre-filter with nylon filter sock for pre-filtration of the feed water into the filter system *Basic* PMMA version.
The inlet water runs inside the filter sock and flows through the mesh. If the mesh is clogged with coarse particles and fibers, this filter stage overflows, so that the filter stocking must be cleaned or replaced. The nylon filter stocking is fixed with cable ties and can be replaced at any time.
For a more intensive pre-cleaning the filter cloth can be taken double - order for it the double length.

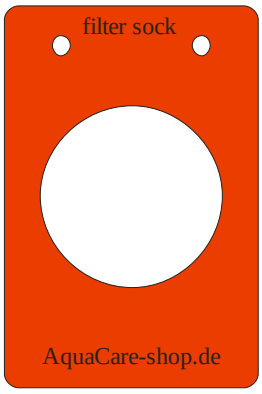


Several filter socks in a larger system with each associated inlet

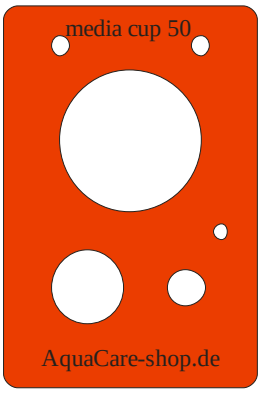
MediaCup for *Basic* filter system - the simple and inexpensive solution for simple filtration tasks: A wide variety of filter materials can be filled into this cup. The MediaCup is simply hung on the bars of the *Basic* filter basin and a water inlet is established. Alternatively, the MediaCup can also be attached to the edge of the multifunction chamber (PMMA version only). The MediaCup can also be placed in any filter basin. Coarse materials can be filled in directly, for fine materials up to approx. 5 mm a filter sponge is supplied. For very fine materials smaller than 5 mm we recommend the use of the filter sock.
You can choose whether the MediaCup is supplied with water that feeds into the *Basic* tank - for this purpose the MediaCup is hung on the lower bars. Or you can install your own water supply - for this purpose the MediaCup is hung on the upper bars. With the second method, a defined flow can be ensured, e.g. in order to be able to lower the phosphate concentration in a targeted manner.

Basic-Zubehör

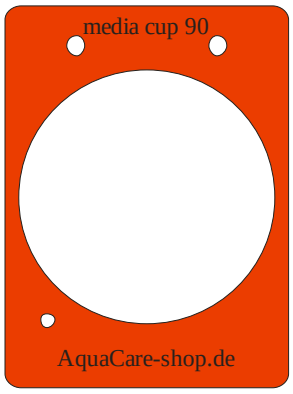
Type	Volume in litres	Lenghts in cm	Diameter in mm	Support surface in mm
Filter sock *Basic* PMMA	approx.. 1.9	approx. 30	approx. 90	135 × 90
Filter sock *Basic* PE	approx. 3.8	approx. 60	approx. 90	135 × 90
MediaCup 50-300 PMMA	0.4	30	50	135 × 90
MediaCup 50-600 PE	0.9	58	50	135 × 90
MediaCup 90-300 PMMA	1.5	30	90	135 × 110
MediaCup 90-600 PE	3.1	58	90	135 × 110
MediaCup 2×50-300 PMMA	2 × 0.4	30	50	135 × 110
MediaCup 2×50-600 PE	2 × 0.9	58	50	135 × 110
RScup-basic-PMMA for Red Sea Media Cup PMMA/PE	-	-	90	135 × 100



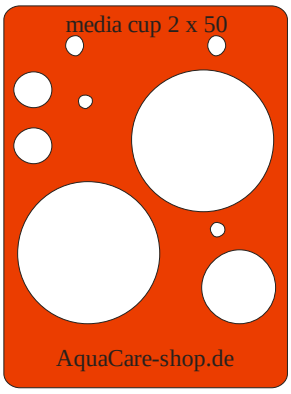
Filter sock *Basic*
135 × 90 mm



MediaCup50:
+ 1×d26 (heater)
+ 1×d13 (sensors)
135 × 90 mm

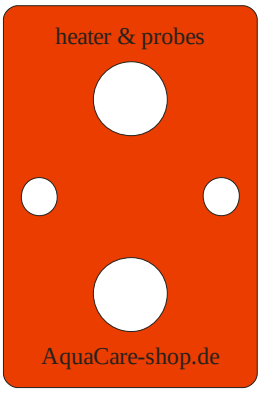


MediaCup90
135×110 mm

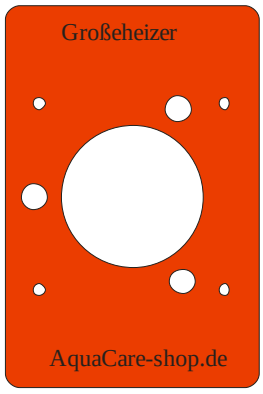


Mediacup 2×50:
+ 1×d26 (heater)
+ 2×d13 (sensors)
135 × 110 mm

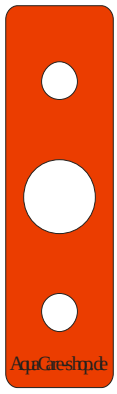
Holder for this and that:



2×d26 (heater)
+ 2×d13 (sensors)
135 × 90 mm



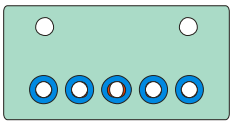
holder for
AquaCare large heaters
135 × 90 mm



holder for
1×d26 (heater)
+ 2×d13 (sensors)
135 38 mm

Water supply holder for
all Mediacups
1/4" thread for water connections

Holder for vertical pipe d20
70×30 mm,



5-fold holder for hoses
with 4 mm inner diameter
80×40 mm

Holder for float valve

Holder for float switch

Filter System *Basic*

- ready for connection with suitable technology -

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Basic 50 with technique

Typ	***Basic* 50**	***Basic* 70**	***Basic* 90**
Max. aquarium size in l *	200	300	400
Sock filter appr. 100 µm	1 ×	1 ×	2 ×
Device holder for:	1 × heater 2 × sensors	1 × heater 4 × sensors	1 × heater 4 × sensors
Heater	200 W	300 W	600 W Titan**
De-gasing stage	yes		
Abschäumer	ACF300A	ACF300A	ACF700A
Air pump	Schego optimal	Schego optimal	Schego optimal
MediaCup	1 × d50 (0.4 l)	1 × d50 (0.4 l)	1 × d90 (1.4 l)
Delivered care products	1 liter each of trace elements, carbonate hardness and calcium, 1 filling high performance activated carbon		
Suitable aquabee energy saving pump*	UP5000e	UP5000e	UP5000e
Suitable aquabee universal pump*	UP2000/1	UP3000	UP3000

Typ	***Basic* 140**	***Basic* 210**	***Basic* 320**
Max. aquarium size in l *	600	1000	1300
Sock filter appr. 100 µm	2 ×	3 ×	4 ×
Device holder for:	2 × heaters 4 × sensors	2 × heaters 4 × sensors	2 × heaters 4 × sensors
Heater	1 × 600 W Titan**	2 × 600 W Titan**	2 × 600 W Titan**
De-gasing stage	ja		
Abschäumer	ACF700A	ACF1000V/A	ACF2000V/A
Air pump	Schego WS3	UP3000	UP5000
MediaCup	1 × d90 (1.4 l)	1 × d90 (1.4 l)	2 × d90 (1.4 l)
Delivered care products	1 liter each of trace elements, carbonate hardness and calcium, 1 filling high performance activated carbon		
Suitable aquabee energy saving pump*	UP5000e	UP8000e	UP11000e
Suitable aquabee universal pump*	UP5000	UP6000	-

* not included in the scope of delivery
** comes with an electronic temperature controller

External overflow

ExFlow

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- simple assembly
- noiselessly adjustable
- very insensitive to dirt
- emergency operation in case of extremely dirty sieves
- Emergency overflow in the external part and possibility of switching off the circulation pump for maximum safety
- readable real flow rate
- flow-optimized transfer tube

If aquariums with internal filter technology are to be retrofitted with a technical tank, either holes must be drilled in the aquarium or an external overflow must be attached.

The AquaCare *ExFlow* has been designed for this purpose. During development, special attention was paid to safety: long jump-proof overflow grids, a large filter surface, a flow-optimised transfer tube and an emergency overflow in the external chamber ensure maximum safety. In addition, a float switch can be installed in the internal part of the *ExFlow*, which switches off the circulation pump when the maximum aquarium water level is exceeded.

The *ExFlow* is simply hooked onto the side or rear pane, fixed with fixing screws, drain and emergency overflow installed. We recommend the use of an angle seat control valve or diaphragm valve to adjust the outlet water - this allows whisper-quiet operation.

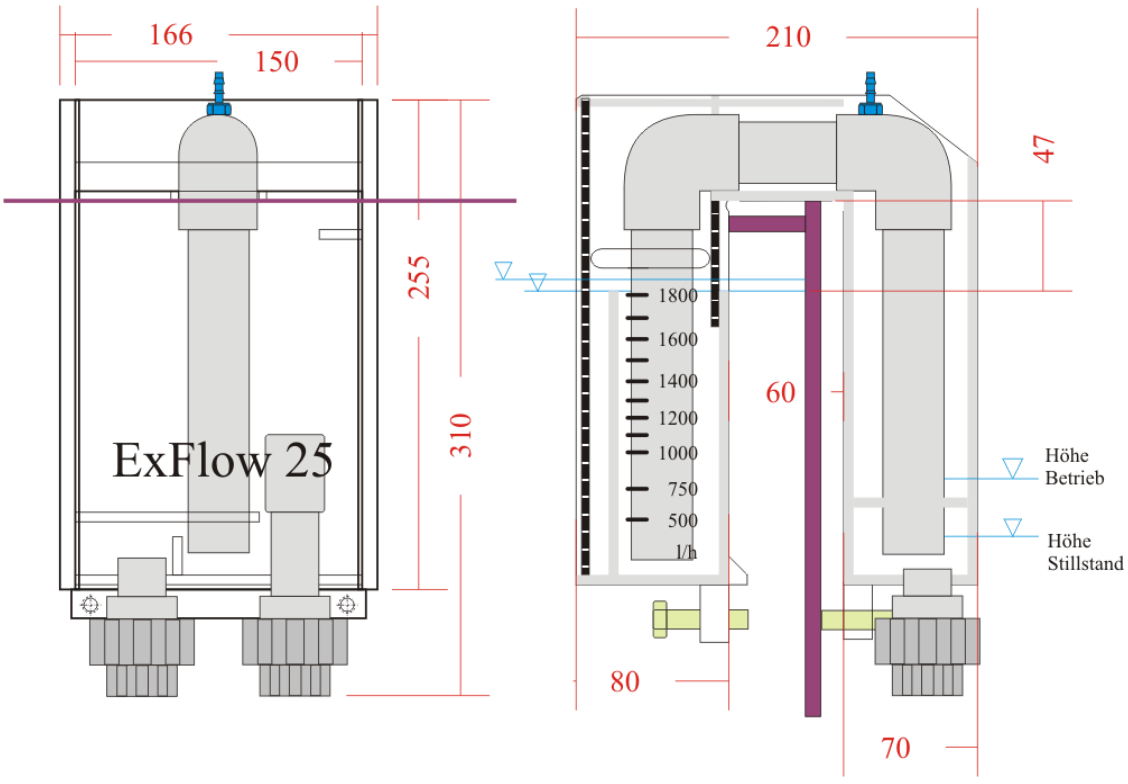
The AquaCare *Exflow* can compensate one malfunction (extremely dirty sieves, wrongly adjusted outlet, or too high inlet water flow). However, a combination of failures may result in malfunction, so we strongly recommend checking the water level in the aquarium and switching off the circulation pump if necessary.

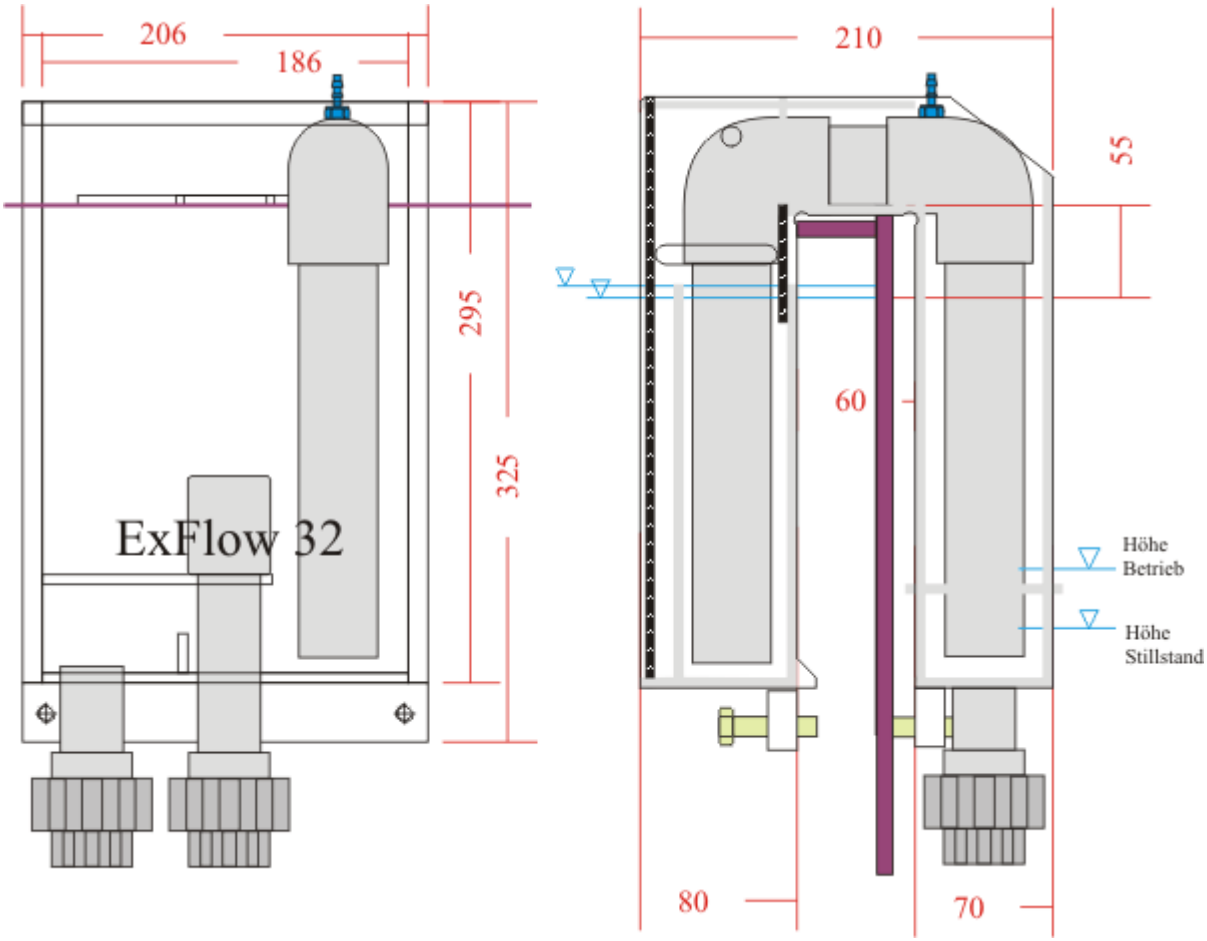
Technical data of the AquaCare *ExFlow*:

Size	**ExFlow 25**	**ExFlow 32**	**ExFlow 40**
Minimum volume flow	1100 l/h *	1600 l/h	
Maximum volume flow	1800 l/h *	2800 l/h	
Maximum aquarium size	360 l	560 l	
Width	166 mm	206 mm	
Depth in aquarium without bar (side pane)	90 mm		
Depth in aquarium with bar (rear pane), maximum	140 mm		
Maximum bar width (including aquarium glass thickness)	55 mm		
Depth on the back side without bar, maximum	120 mm		
Depth on the back with web, minimum	70 mm		
Total height of the *ExFlow* on the aquarium side	255 mm	292 mm	
immersion height of the *ExFlow* from the top of the aquarium	200 mm	240 mm	
Height above aquarium pane	55 mm	60 mm	
Water level in the aquarium outside of operation	55 mm		
Water level in aquarium at full load	**45 mm**		
Buildup height (difference water level "in operation" - " out of operation")	typical 8 mm max. 10 mm		
Triggering of the optional float switch or water level if the discharge is set too low (activated emergency overflow)	25 mm		
Width of filter combs	5 mm		
Width of the filter comb passages	5 mm		
Number of filter combs	1 × back, 1 × front		
Total length of the filter combs	292 mm		
Transfer tube diameter	d32 *	d40	d50
Connections drain and emergency overflow	PVC 25	PVC 32	
Minimum drop depth of the drain pipe at full load (measured from aquarium water surface to water surface of filter tank)	80 cm		
Flow scale	750-1800 l/h		

* lower volume flows can be achieved with smaller transfer tubes:
d25: 600-1000 l/h; d20: 400-650 l/h (for a 20 mm transfer tube we recommend to reduce the discharge of the *ExFlow* to d20)

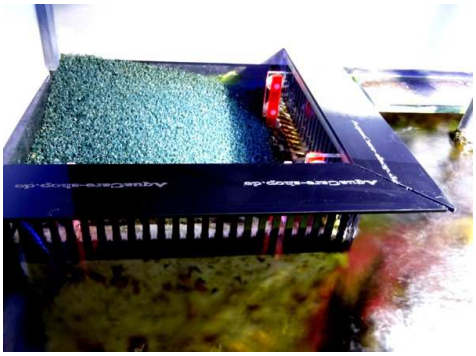
Dimensioned sketches of the AquaCare *ExFlow*:





Pluggable overflow comb

The overflow comb of AquaCare **must not be glued to the overflow shaft of an aquarium**. The plug system can be adapted to the thickness of the aquarium glass and can be mounted and dismounted quickly. The overflow comb can be equipped with a **removable cover** and thus **largely prevents algae growth** between the comb gaps. Thus the water level in the aquarium remains constant. - The cover is about 40 mm in front, so that it is much less likely that fish will jump over the comb into the overflow shaft.



Corner and centre shaft solutions

the two-part overflow comb

AquaCareFlotor

- the new generation -

High Power Protein Skimmer

AquaCare GmbH & Co. KG
Am Wiesenbusch 11 • D-45966 Gladbeck • Germany
http://aquacare-shop.de
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Advantages of the AquaCareFlotor ACF

- **filter sump** or **external** skimmer versions
- different gassing systems possible:
  - models with wooden diffusers that can be easily exchanged from the outside
  - venturi models with effective injector
  - needle wheel for short models
- extremely high contact time between seawater and air with small size, thus:
  - high oxygen enrichment
  - strong formation of the carbon dioxide/hydrogen carbonate/ carbonate buffer
  - more uniform pH value
  - much smaller size compared to conventional skimmers
  - low operating costs
  - **Response concentration at 3 µg/l** protein (BSA, ozone mode)

AquaCareFlotor
ACF1000V-060

Foto: Othmar Pötsch

- **reduces the free bacteria number** of the aquarium water to approx. 20%
- **reduces ozone consumption** by approx. 70% compared to other systems

Why skimming?

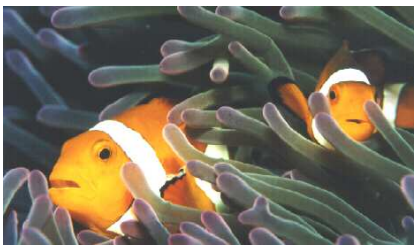
In all aquariums waste products are produced continuously. Fish excrete a large part of the ingested food in the form of ammonium / ammonia (= NHx), proteins, their building blocks (amino acids) and fibers (dietary fiber). In order to prevent the fish from poisoning themselves over time, these substances must be removed or converted to non-toxic products. With the help of biological filtration almost all degradation steps up to carbon dioxide, water, nitrate, phosphate and sulfate. However, the final products accumulate. Using skimming or flotation, proteins are immediately removed from the water without being microbiologically oxidized to the end products. The result is a much lower increase in end products, especially nitrate and phosphate. The water is less polluted, the redox potential (ORP) is higher and the animals feel much better.

picture: Dirk Walber

In the presence of a sudden load, e.g. due to a dead animal or increased feeding, a biological filter can only react very slowly to the "extra work". Especially the nitrifying bacteria (*Nitrosomonas* and *Nitrobacter* group) have adaptation times of several days. Flotation, however, reacts immediately and can prevent or mitigate the accumulation of the toxic intermediates NHx and nitrite.

Principle of flotation

Proteins have the characteristic of attaching themselves to surfaces. During flotation, an enormous surface is created with the help of very many and very small air bubbles. The proteins attach themselves to the surface (static attraction, adsorption). In addition, other substances can dock onto the attached proteins: dirt particles, dead cells (bacteria, algae, fungi) and partly metals (a sufficient supply of trace elements should be ensured!).



picture: Othmar Pötsch

A precondition for a functioning flotation is a small air bubble size (diameter below 1 mm), a salt content of at least 15‰ and a fat content that is not too high.

The effectiveness of flotation depends on several factors:

1. The higher the temperature, the faster proteins adsorb to the air bubbles.
2. The smaller the bubbles, the more surface area and thus the better the skimming performance.
3. The longer the contact time, the better the flotation.
4. The lower the turbulence (vortexing) in the reaction tube (contact tube), the less proteins and adhering contaminants will be redetached from the air bubble.
5. The lower the protein load in the aquarium, the higher the percentage skimming yield.
6. Ozone addition to the air precipitates further waste materials and statically charges uncharged proteins so that these materials can also be skimmed off. Protein skimming is increased by 30% with ozone.

Additionally advantages of the flotation technique

During flotation, a high volume of air is brought into contact with water. Due to the patented gas bubble guidance in the liquid, the oxygen content is raised above the saturation value by 2 mg/l with the skimmer. Oxygen deficits caused by animal respiration and the biofilter are compensated.

Carbon dioxide is constantly consumed by plants (algae) and many animals (corals with zooxanthellae) in the marine aquarium, so the carbonate hardness drops and the pH of the water rises too much during the day. The AquaCareFlotor effectively enriches the water with carbon dioxide from the air and reduces this problem.

The bacteria content is reduced considerably - to approx. 20%. Finest pollutants and precipitates are quickly removed from the water and provide crystal clear water. The colors of the animals work optimally.

Some variants of skimming technique

Co-current principle:
Water and air bubbles move in the reaction tube from bottom to top - i.e. in the same direction. The contact time air / water and thus the performance of the skimmer is low.

Countercurrent principle:
The water is directed from top to bottom through the reaction tube, the air from bottom to top. The contact time is increased with this principle - the skimming works better.

Suspended current principle - AquaCareFlotor:

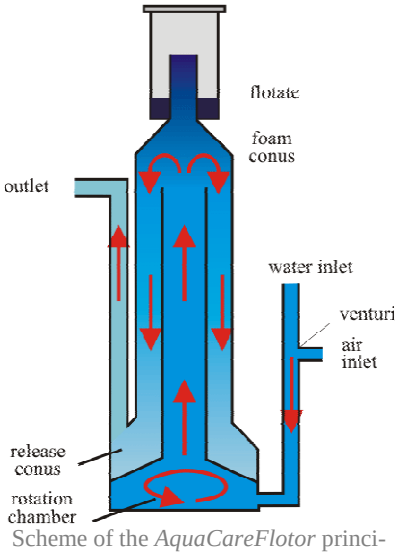
The aquarium water is enriched with air by an air

wood, injector or needle wheel and fed into the unit at the deepest point.The rotation chamber is located at the lowest point. Since the highest pressure is in this section, gas exchange is improved. The water-air mixture rises in the reaction tube. The protein-containing foam column forms there.

picture: AquaCare

Some of the air bubbles are forced downward through the outer tube by the water flow. At the expansion cone, the water flow slows down due to the larger tube cross-section. This principle allows the air bubbles to remain in the water for a particularly long time and to accumulate considerably more protein.

After a long contact time (gas bubble-water), the bubbles return to the foam section. The foam rises to the top and is slowly dehydrated. The solid foam, which is loaded with waste materials, reaches the collecting cup. In this way, waste substances are effectively and safely removed from the aquarium.



Scheme of the *AquaCareFlotor* principle (with Venturi = Injector)

Too much skimming?

AquaCare means that too much skimming cannot take place. The larger the skimmer, the cleaner the water. But to prevent deficiency symptoms it is essential to dose trace elements in case of oversized skimmers. Also, with oversized skimmers, food for fish and lower animals (e.g. plankton) can be handled more generously. Animals that are well fed are less susceptible to diseases, live closer to nature and show a more natural behavior. A fattening of the animals - as in freshwater - is hardly possible.

What is the right skimmer for me?

First of all, the available space should be considered. Does all the technology have to go under the aquarium or is there enough space for a tall version?

High skimmers are more effective than lower models in any case because of the longer water retention time (at same water inlet flow).

However, this statement is only valid for the same process. If different processes or skimmers from different manufacturers are compared, it is possible that a low model will perform better than a high model.

The second decision to be made is the bubble injection system. When considering the performance of aquaristic skimmers, there is only one winner: the wooden skimmer. With good wooden diffusers, very fine and uniform bubbles can be generated with little pressure (little energy). This point is very important for the performance of a skimmer. The disadvantage of wooden diffusers is their relatively short service life. Every 4-12 weeks the air stones have to be replaced, because the performance is reduced by algae and bacteria deposits and by decomposition processes of the wood. The use of ozone intensifies the decomposition processes.

To minimize the maintenance AquaCare has placed the wood injectors in an extramodule outside the actual skimmer.

The injector, also called venturi, is in principle maintenance free. In smaller aquaristic systems the gas bubble size is a little bigger; the efficiency a little lower. However, if a venturi is compared to a wooden skimmer that is too old, the injector wins the comparison. - For large skimmers with corre-

spondingly strong pumps the bubble size is comparable to that of wooden diffusers due to the higher working pressure.

The AquaCare injector types need only one pump for the water inlet and for the bubble generation. The wood injector types need additionally an air pump.

The AquaCare injectors are optimized so that calcification (KH up to 10°dH) is nearly impossible.

The needle wheel pump is an alternative when it comes to energy saving and effectiveness. With good processing, the needle wheels last a sufficiently long time.

For small skimmers, wooden diffusers are more effective than venturi nozzles - as long as they are replaced regularly.

Finally, the question remains, what water flow rate should the skimmer have.

Basically, the higher the water flow rate, the more contaminants the skimmer can remove from the aquarium water, the better the water quality.

This is because the skimmer competes with biological degradation processes in the aquarium and filter system. The lower the exchange rate between skimmer and aquarium, the more biodegradation will occur in the aquarium instead of being physically removed by the skimmer.

The maximum aquarium sizes given by AquaCare for the respective skimmer models are related to an turn-over of 1.5 hours, i.e. the aquarium volume is theoretically passed through the skimmer in 1.5 hours. If the aquarium is fed a lot and the stocking density is high, the turn-over should be increased. Rates below 0.2 hours in small aquariums should not be attempted for cost reasons. In systems with low organic load (little food, few animals) the turn-over can be increased. But it should be noted that the risk of oxygen deficiency, bacterial bloom, and low ORP increases with undersizing.

picture: Othmar Pötsch

Short Comparison between type "A" and "V"

Type	Type "A"	Type "V"	Type "N"
System	wooden **a**ir stone	**v**enturi = injector	**n**eddle wheel
Quietness	⊕ very quiet	quiet(sucking sound is reduced by muffler)	quite
Bubble quality	⊕ extreme small and very uniform	small and uniform	small and uniform
Energy consumption	⊕ very low	low	⊕ very low
Maintenance	air stone must be periodically (every 4-12 weeks) changed - polluted air stones degrade performance	⊕ Venturi is nearly maintenance free	⊕ nearly maintenance free

Short skimmers for the filter sump

AquaCare*Flotor* 700 A

AquaCare*Flotor* 1000V

***AquaCareFlotor* Model**	**300A-44**	**700A-52**	**1000A-60**	**1000V-60**	**2000A-60**	**2000V-60**	**3000V-60**	**3000N-60**
order number	351-003	351-007	351-010	352-010	351-020	352-020	352-029	355-030
system	air stone	air stone	air stone	injector	air stone	injector	injector	needle wheel
system convertible*	no	no	yes		yes		yes	
max. aquarium size**, litres / US gal	300 / 80	700 / 180	1.000 / 260		2.000 / 530		3.000 / 800	
max. height, cm	44	52	60					
necessary height, cm	46	54	62					
height outlet, cm	28	27	30				32	
min. water lever, cm	10							max. 10 cm
outer diameter, mm	63	75	90		110		140	
footprint size, mm	140 × 180	150 × 220	170 × 330		170 × 330	200 × 330	300 × 370	
volume foam cup, liters	0.5	0.7	1.4				2.3	
air input, l/h; (at low organic loads ca. 1.2 time more)	80 l/h at ca. 100 mbar	170 l/h at ca. 100 mbar	220 l/h at ca. 150 mbar	-	400 l/h at ca. 150 mbar	-	-	-
automatically sucked air, l/h	-	-	-	220 l/h	-	400 l/h	500 l/h	250-350 l/h
inlet water flow, l/h	240	500	700	750	1300		2000	
ozone needs (reef tank), ca. mg/h	5	15	20		40		60	
materials	PVC, ABS, PP, PMMA, NBR, (PA at air stone types)							
number and size of air stones	1 × Gr. 2	1 × Gr. 2	1 × Gr. 3	-	1 × Gr. 3	-	-	-
weight without pump, ca. kg	1.7	2.1	2,6	2.5	3,7	4	9	
suitable pumps***	Eheim 1046 UP300	Eheim 1048 UP1000	Eheim 1250 UP2000	Eheim 1260 UP3000	Eheim 1260 UP3000	Eheim 1262 UP5000	UP6000 UP11.000e RD6000	UP8000e skimmer
water inlet: hose connector or female thread or PVC connector	12/16 nozzle 1/4“ female	16/22 nozzle adapter for Eheim + aquabee	16/22 hose nozzle				PVC d20+25 nozzle 20+25	-
water outlet (PVC-Fitting mm)	d20	d32			d40		d50	
order number Hang-On bracket	351-003a	351-007a	351-010a		351-020a		-	-

Advantages of the short skimmers:

- Lower energy consumption compared to high models
- Low space needs: compact base with space for pump
- Operation in filter sump or external
- Hang-On bracket available

other voltage and frequencies on request. Special sizes and equipment are possible. Modifications possible.

* "convertible" means, that the gas inlet system is changable.

** The maximum aquarium volume is calculated for „normal" tanks with living rocks and some fishes. If you have more fish and/or you take much food, you have to choose the next size. The ozone input can vary depending on the number of fish. The needed size depends on many factors: e.g. the wished water quality, fish load, food input, temperature, the kept species, additional technique like bio-filter, UV, ozon. The exact needed size may vary from our recommendation. In complicated cases ask AquaCare please.

*** UP are aquabee pumps; RD is a RedDragon pump

High skimmers with maximum efficiency

AquaCare*Flotor* 2000A-130
AquaCare*Flotor* 2000V-130

***AquaCareFlotor* Model**	**2000A-130**	**2000V-130**	**3000A-170**	**3000V-170**	**6000V**
order number	ACF2000A-130	ACF2000V-130	351-030	353-030	354-020
system	air stone	injector	air stone	injector	injector
system convertible [1]	yes		yes		yes
max. aquarium size, litres / US gal	2000 / 500		3000 / 800		6000 / 1600
max. height, cm [2]	130		170		180
necessary height, cm	+ 5 cm				
height outlet, cm	82		125		110
water level of filter sump	depending on the height of the suction nozzle of the pump used - up to maximum lower edge of the drain pipe				
outer diameter of main tube, mm	120		140		200
footprint size, mm	250 × 195		330 × 370		400 × 600
volume foam cup, liters	2.4 (with drain)		6 (with drain)		7 (with drain)
air input, l/h; (at low organic loads ca. 1.2 time more)	400 l/h at ca. 150 mbar	-	650 l/h at ca. 150 mbar	-	-
suitable compressor	Medo 1.6 (29 W)	-	Medo 1.6 (29 W)	-	-
automatically sucked air, l/h	-	400	-	700	1300 [4]
pumped water volume, approx. l/h	1300		2000		4000
ozone requirement (reef tank), approx mg/h	40		60		120
materials	**Acrylic glass** = PMMA, PVC, PA, ABS, PE, NBR, silicone				
number and size of air stones	2 × size 3	-	2 × size 3	-	-
weight without pump, ca. kg	6.6	6.0	16		23
suitable pumps [3] (typical load)	UP3.000, 40 W UP5.000e (20 W) RD Eco5 130 W (20 W) RD X 40 W (20 W)	UP6.000, 100 W UP11.000e (80 W) RD Eco5 130 W (80 W)	UP6.000 UP11.000e	MD55R-5M UP11.000e	MX400
water inlet:	PVC d25		PVC d25 (32)		PVC d40
water outlet	PVC d40		PVC d50		PVC d63

Advantages of the high skimmers:

- maximum efficiency
- optical evaluation of the organic load possible
- water flows up to 240 m^3/h possible (aks for the professional bro-chure

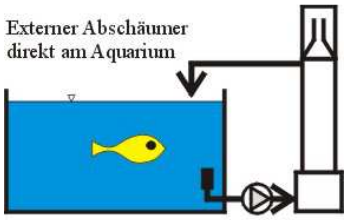
other voltage and frequencies on request. Special sizes and equipment are possible. Modifications possible.
[1] it is possible to change the type of air system later on (venturi/ air wood), [2] special heights are possible; [3] UP is an aquabee term (filter sump operation possible), MD and MX are Iwaki terms (only external operation possible); Red Dragon is a Royal Exclusiv term, [4] standard built-in air flow meter,
Maximum design size: see remark under low skimmer table.

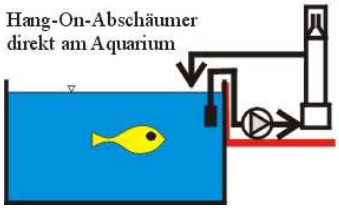
Skimmer shutdown

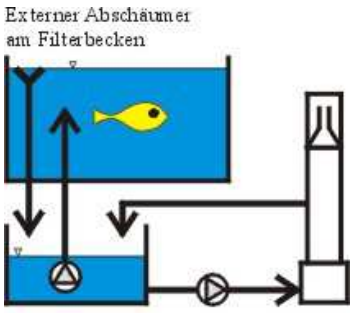
for AquaCareFlotoren (and other skimmers) with 1-phase motor (230 V)

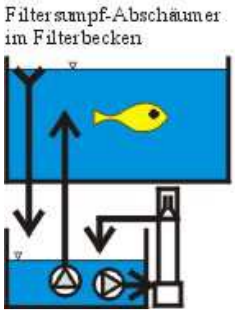
This small circuit prevents the skimmer from overflowing. The device is useful for skimmers that are not operated in the filter sump (external or hang-on).
If the flotate cup is filled, the microcontroller switches off the supply pump or the air pump for the skimmer with a time delay. This ensures that in case of wrong skimmer setting or unexpected overload the skimmer does not overflow and cause flooding.
Maximum switching capacity 500 Watt, dimensions: 130 × 130 × 50, 2 m cable each for float switch, mains supply and consumer. Order number: 600-002

Possible mounting of the skimmer in the aquarium system









High skimmer models can be connected directly to an aquarium. The water is sucked in through a filter basket and pumped through the skimmer. Depending on the structural conditions, the suction pipe can be led through the aquarium or above the aquarium. In the second variant, a venting device must be installed so that the skimmer pump can be put into operation. - From the skimmer, the water flows back into the aquarium without any rise. To minimize the entry of the smallest air bubbles, a filter sponge can be drawn over the drain pipe.

Another direct connection is the Hang-On system: here a low skimmer is hung from the outside of the aquarium by means of a special holder. The connections are made in the same way as for the high models.

Hanging the skimmer directly into the aquarium is another method, but for aesthetic reasons it is not useful for show aquariums, but it is a variant for quarantine, experimental or breeding tanks.

If a filter tank is available under the aquarium or next to the aquarium, the skimmer can either be used as an external skimmer or low models can be operated in the filter sump. If the return water from the skimmer passes through a degassing stage, all small air bubbles are eliminated so that the pump that returns the water from the filter basin to the aquarium pumps only crystal clear water. Alternatively, the return water from the skimmer can be fed directly back into the aquarium. This saves an additional return pump (filter tank-aquarium), but only works with very high skimmers: the drain water must always run downhill.

AquaCareFlotor

Fresh Water Flotation Units

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Why flotation?

Bubble structure of an AquaCare fresh water skimmers

Compared to biological techniques flotation takes out proteins and other compounds without oxygen depletion. Depending on scale and organic load solids are taken out additionally. With this modern and economic technology all other downstream filter stages (mechanical, biological) are notably relieved. Lower investment (size of downstream filters), less running costs (flushing processes are minimized) and needed space (small size of flotation units) speaks for the integration of this technique.

Why is flotation so difficult in fresh water?

ACF3000F with pump
(modification possible)

For sea water purposes skimming technique is well-used. Because of the high surface tension of fresh water the bubble forming units used in sea water are not suitable.

On the one hand with sea water equipment like air stones, injectors (venturi) and needle wheels is not able to form small bubbles. On the other hand small bubbles will combine to large bubbels very rappidly. Large bubbles are destroying the protein foam in the upper part of a skimmer. With conventional technique the skimming process will start only at very high concentrations of floatable substances, because these substances lower the water tension.

With the help of decompression flotation it is possible to create so small bubbles that the combining of them is negligible. A two-phase-peripheral pump enriches the water at high pressure with air. The enriched water is passing a relief valve- the pressure falls down abruptly. Hereupon very micro-bubbles (30-50 µm) are created. These size is so stable, that they will adsorb organic substances. The generated surface is 10 to 20fold larger than in fresh water skimmers. So lower water flows are possible.

The principle of the skimmer

The process water is pumped by a special pump that creates the bubbles by itselfes. The air-water- mixture is injected at the lowest point of the skimmer to get the maximum of oxygen and ozone into the water. The gas-water-mixture ascents in tube. There the organic loaded foam is created.

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® builds fresh water skimmers from 1 to 55 m^3/h

for large systems:	show size aquaria
	water mammal tanks
	koi ponds
Aquakultursystemen:	fish breeding
	shrimp farming

Advantages of the suspended flow principle

- extremely **long contact time** between the air and the sea water resulting in:
  - high enrichment with oxygen
  - more even pH value
  - smaller than already available skimmer
  - low running costs (only one pump for injector and water flow)
- **lowers** the numbers of free-swimming **bacteria** to about 20%
- **reduced ozone consumption** of about 70% compared to other skimmers, therefore reliable and cheap operation

Feature of the *AquaCareFlotor*

- reduced size
- maintenance is more easy
- *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 3.000F...ACF 170.000F

***AquaCareFlotor* size**	**3,000 F**	**6,000 F**	**16,000 F**	**30,000 F**	**50,000 F**	**70,000 F**	**110,000 F**	**170,000 F**
Order number	353-030F	354-020F	354-030F	354-040F	354-050F	354-065F	354-080F	354-100F
Water flow, ca. m^3/h	1	2	5,5	10	16,5	25	37,5	55
Air flow, ca. m^3/h	0.04	0.08	0.22	0.40	0.66	1.0	1.5	2.2
Ozone consumption*, g/h	0.06...0.3	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
Total height, m	1.7	1.8	2.0	2.1	2.3	2.4	2.8	3.1
Foot print size L×W, m**	0.37 × 0.30	0.6×0.4	0.75×0.5	0.95×0.6	1.1×0.8	1.3×0.9	1.5×1.1	1.8×1.4
Diameter main tube, mm	140	200	300	400	550	650	800	1,000
Water volume, m^3	0.03	0.05	0.12	0.17	0.41	0.58	1.2	2.2
Contact time water, min	1.7	1.6	1.4	1.0	1.6	1.4	2.4	2.2
Contact time air, min	größer 10							
Material main tube	PVC transparent	PMMA (acrylic glass)		PVC transparent			PE HWST black	
Material skimmer cup	PMMA (acrylic glass)			PVC transparent			PVC transparent (PE on request)	
Material basis	PVC gray						PE HWST black	
Material flange sealing	NBR 70		Silikon 60					
Material flange screws	Polyamide (corrosion free)						Stainless steel	
Intlet skimmer	d25, DN20	d40, DN32	d50, DN40	d63, DN50	d63, DN50	d75, DN65	d90, DN80	d110,DN100
Outlet skimmer	d50, DN40	d75, DN65	d90, DN85	d125,DN110	d125, DN110	d140, DN125	d160, DN150	d200, DN180
Height of outlet, m	0.86	1.1	1.1	1.1	1.1	1.1	1.5	1.7
Drain skimmer cup	-	d20, DN15	d20, DN15	d40, DN32	d40, DN32	d40, DN32	d50, DN40	d50, DN40
Drain basis (×2)	Eheim 9/12	d20, DN15	d20, DN15	d25, DN20	d32, DN25	d40, DN32	d50, DN40	d50, DN40
Connector exhaust air	-	d25, DN20	d32, DN25	d40, DN32	d40, DN32	d50, DN40	d63, DN50	d75, DN65
Connector ozone	D10,DN8	d20, DN15	d20, DN15	d25, DN20	d25, DN20	d32, DN25	d32, DN25	d40, DN32
Numbers of flushing nozzles	-	6	8	12	14	16	18	20
Flush. water flow, 4 bar, m^3/h	-	0.18	0.24	0.36	0.42	0.48	0.54	0.60
Connector for flushing	-	d6 PE	d10 (PE pressure tube)					
Operation temperature	2...35°C							
Weight empty in kg		45	52	95	130	180	260	430
Weight operation in t		0.1	0.17	0.27	0.44	0.76	1.46	2.63
Suitable pump	PBU201E10		LBU403C120L			LBU603C160L	LBU603E162L	
Connection of pump	¾“ female		DN65-DN40			DN80-DN65		
Water touched material of pump	1.4581, 1.4517, 1.4462		EN-GJL-250, CuSn12-G, 1.4057					
Electrical connection, kW	400V, 50 Hz							
Connected power	1.5		4			11	18,5	
Weight of pump	22							

The choosen size depends on many factors, e.g. the stocking, food input, temperature, additional technique like biofilters, UV lamps, ozone input and the wished water quality. If you are not sure what size is the best for your systems pleaase contact AquaCare

* The ozone needs is extremely depending on the organic load. ** It is possible to fix the pump onto the basis plate.

Ozone Reactor OZR for Fresh Water Ponds

AquaCare GmbH & Co. KG
www.aquacare-shop.de
www.aquacare.de • info@aquacare.de

3 stage Ozone Reactor for fresh water Ponds and Pools

For fresh water fish ponds and pools AquaCare has developed an ozone reactor that puts ozone fast and efficient into the water. The dissolved ozone cracks biological persistent substances like “Gelbstoffe” and humic acids to realize their biological degradation – the water gets crystal-clear. Nitrite is oxidized and is consequently not harmful for flora and fauna, especially in the start-up phase of a pond. The oxygen concentration is rising.

The function of the AquaCare OZR

1. stage: in the upper section the feed water is mixed turbulently with ozone containing air. A small air should pump air through the ozone generator into the OZR.
2. stage: within the trickling section the water flows over trickling filter material that realizes a good transit of the ozone into the water.
3. stage: in the water filled section of the OZR the smallest bubbles will stay for a long time in the tube and dissolves more ozone.
The outlet water may flow over an activated carbon filter to eliminate surplus ozone or may flow directly into the pool. With the second version the ORP should be controlled to avoid over concentrations that can harm organisms.

Connection of the OZR at the water system

The OZR has to be connected with a feed water (separate pump or bypass of the main pump) with enough pressure / flow. A small air pump (option) presses the air through an ozone generator (option) into the OZR. To prevent back-flowing water into the ozone generation a check valve (option) should be connected or a safety loop must be installed.
To prevent an overdosing of ozone it is possible to connect the ozone generator with an ORP-control. Another way to prevent overdosing is an activated carbon filter that is connected after the OZR. The diameter of the activated carbon filter must be minimum as large as the main tube of the OZR.

Technical data of the OZR50 - OZR70

Size	**OZR50**			**OZR70**		
Order number	OZR50-40	OZR50-70	OZR50-100	OZR70-45	OZR70-70	OZR70-100
System	three-stage reactor					
Max. pond / pool size in m^3	4	8	12	8	14	22
Diameter main tube in mm	50			70		
Total height in cm*	40	70	100	45	70	100
Necessary height	+ 5 cm					
max. ozone needs in mg/h	30	60	90	55	110	160
Foot print: length × width in mm	140 × 100			180 × 140		
max. inlet flow in m^3/h	0.2...0.4			0.3...0.7		
Materials	PMMA, PVC, ABS, PE, PVDF, NBR					
Connection water	G1/4", Nozzle 8			PVC d20, Nozzle 12 mm		
Connection ozone	6/4 mm					

* Special heights are possible

Technical data of the OZR100 - OZR150

Size	OZR100			OZR150		
Order number	OZR100-50	OZR100-70	OZR100-100	OZR150-50	OZR150-70	OZR150-100
System	three-stage reactor					
Max. pond / pool size in m^3	20	30	46	44	70	100
Diameter main tube in mm	110			150		
Total height in cm*	50	70	100	50	70	100
Necessary height	+ 5 cm					
max. ozone needs in mg/h	150	230	350	330	500	800
Foot print: length × width in mm	210 × 160			310 × 220		
max. inlet flow in m^3/h	0.8...1.5			1.7...3.6		
Materials	PMMA, PVC, ABS, PE, PVDF, NBR					
Connection water	PVC d20, Nozzle 16 mm			PVC25, Nozzle 25		
Connection ozone	6/4 mm					

* Special heights are possible

Technical data of the OZR250 - OZR300:

Size	OZR250	OZR300		
Order number	380-250	OZR300-50	OZR300-100	OZR300-150
System	three-stage reactor			
Max. pond / pool size in m^3	150	170	440	700
Diameter main tube in mm	250	300		
Total height in cm*	195	50	100	150
Necessary height	+ 5 cm			
max. ozone needs in mg/h	2500	1300	3200	5300
Foot print: length × width in mm	430 × 400	310 × 220		
max. inlet flow in m^3/h	5...10	7...15		
Materials	PVC, PE, PVDF, Silicone	PMMA, PVC, PE, PVDF, Silicone		
Connection water	PVC d50	PVC25, Nozzle 25		
Connection ozone	8/6 mm			

* Special heights are possible

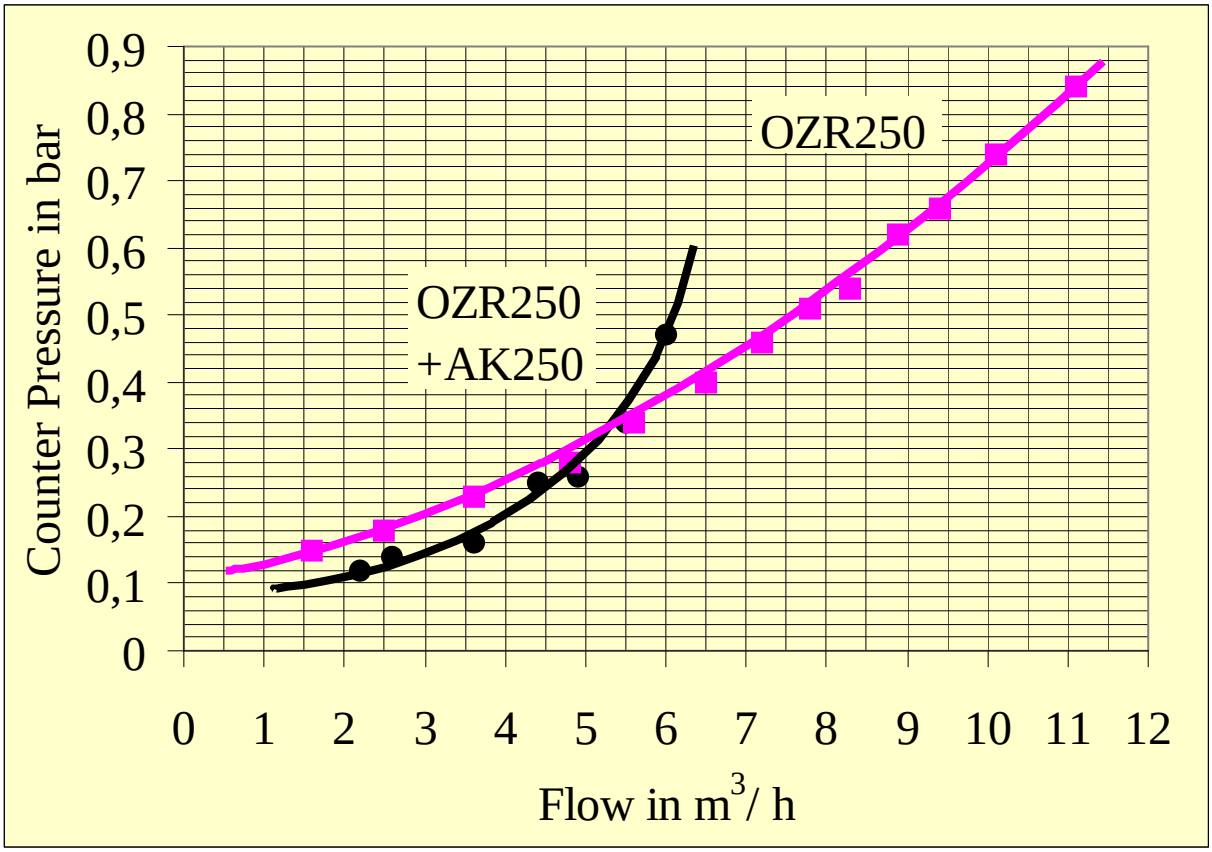
Tips for operation

 Use only pre-filtrated water: otherwise dirt and fibres get caught in the packing and causes more maintenance.

 Take attention that the connected air pump will bear down all resistances: check valven, ozone generator, tubes, counterpressure of OZR and counterpressure of downstream installed filters, e.g. acitvated carbon.

 The counter pressure depends on the choosen water flow (the more flow the higher the counter pressure in the OZR, see diagram below) and if the outlet ball valve is throttled: the higher the counter pressure in the OZR the more ozone will dissolve.

Performance curve



Performance curve of OZR250 (violet) and OZR250 plus a downstream activated carbon filter AK250 (black); the counter pressure was measured at the gas (air plus ozone) inlet.

Warning note

Attention! Ozone is a harmful substance and is to use in accordance with the manual of the ozone generator and local regulations only.

Ozone Generator

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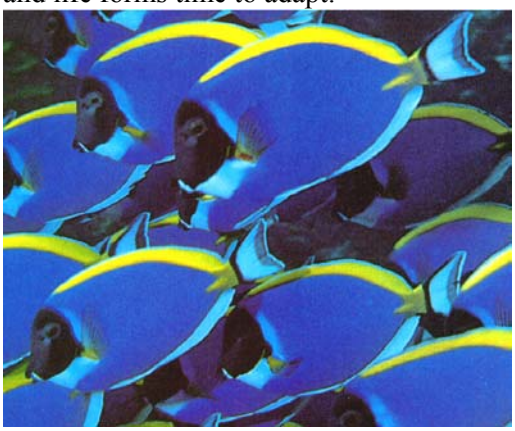
Small generators for aquaristics

Ozone is a special form of oxygen.
If it is disintegrating an O-radical evolves that is able to split organic substances and oxidises inorganic matters. - If a skimmer is operated with ozone the efficiency will increase by about 30%. Additional the skimmer will work more constant. This means if e.g. food is added to the aquarium the skimmer will not overspill so quickly. So a more safe operation is achieved. - Also pollutants like ammonia and nitrite will not establish so rapidly because ozone oxidizes them to less harmless substances. - Persistent substances, that are not degraded by bio-filters or taken out by a skimmer, are seen in the aquarium as a yellow discolouration of the water, e.g. tannins. These class of substances are cracked by ozone and the cracking products are eliminated by a skimmer of a bio-filter after it. As a consequence the ORP value (redox) and the oxygen concentration will increase. The water will be crystal clear. Free floating bacteria (bacterial bloom) and some phase of parasites (e.g. free swimming stages of *Oodinium* or *Ichthyophthirius*) are reduced by ozone. So sensitive fish like *Acanthurus leucosternon* (Powderblue Surgeonfish) are held in ozone treated water with less losses. – But ozone should be handled intelligent. If too much ozone is used the gills of the fishes and invertebrates are harmed. As a principle for a reef tank: if you can smell ozone at the skimmer or in the water you have dosed too much. In combination with an AquaCare-Flotor there is one rule of thumb: 20 mg/h (ppm) per 1000 liters (260 US gal) are enough. With other skimmers you may need more ozone. It is important to change the ozone input very slowly (except in case of emergency), to give all processes and life forms time to adapt.


Powderblue surgeons are very sensitive fish

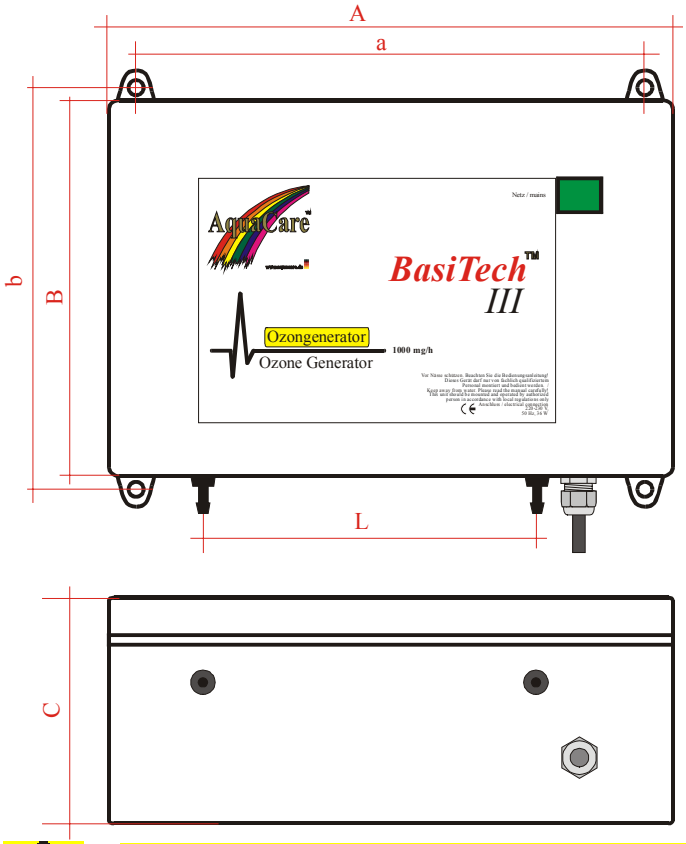
Type	**OG 150**
Order number	OG0015
Max. capacity, air operation 50% rH	150 mg/h
Max. capacity, dry air	300 mg/h
Adjustment range	50...150 mg/h
Min. air flow	50 l/h
Pressure range	-1...0.2 bar
Temperature range	0...40°C
Connector for ozone hose	5 mm
Electrical connection	230 V, 50/60 Hz
Installed load, W	6 W
Dimension of housing	130×130×50 mm
Length of cable.	1.5 m
Material of box	ABS
Weight	600 g

Attention! Ozone is a harmful substance. Read the instruction manual very carefully. These generators are only suitable for air. Do not use pure oxigen.

Ozone units for aquaristics with larger capacity

For larger needs AquaCare offers ozone generators built in a plastic housing. Following components are integrated: high voltage unit, ozone chamber, control light, main cable. Scope of delivery includes mounting material.

Type	OG 500	OG 1000	OG 2000
Order number	OG0050	OG0100	OG0200
Max. capacity with air 50% rH in mg/h	500	1000	2 × 1000
Max. capacity with dry air in mg/h	1000	2000	2 × 2000
Min. air flow	150 l/h		
Pressure range	-1...0.2 bar		
Temperature range	0...40°C		
Electrical connection	230 V, 50/60 Hz		
Installed load in W	17	36	72
Degree of protection	IP 65		
Connector for ozone hose	5 mm		
Dimensions of housing in mm	289 ×239 × 109		300 × 200 × 120
Housing	ABS		
Length of cable	1.5 m		
Weight in kg	1.7	2.1	4.3



	OG 500	OG 1000 OG 2000
L	87 mm	177 mm

Ozone is normally used in combination with a skimmer ACF (sea water) or an ozone reactor OZR (fresh water)

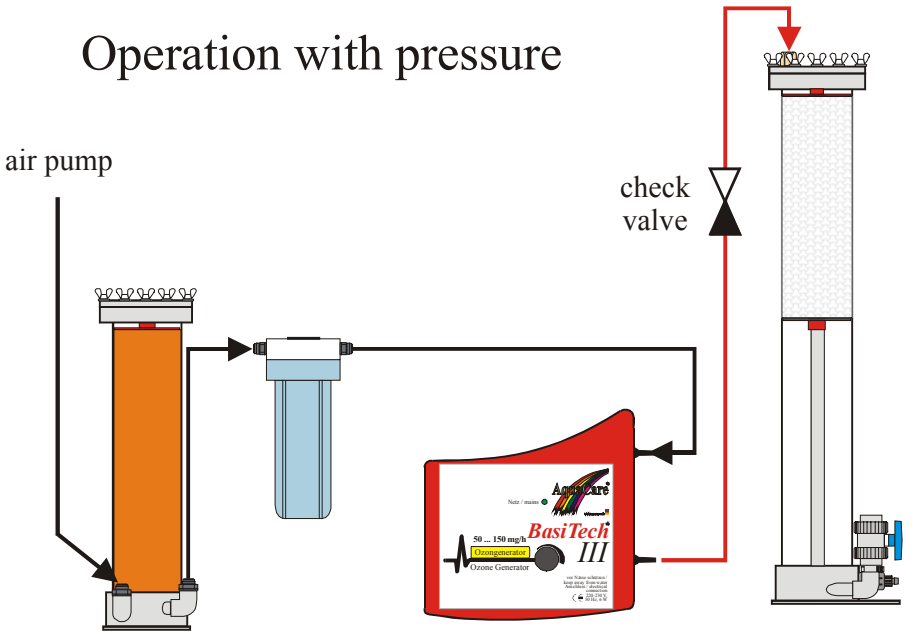
Attention! Ozone is a harmful substance. Read the instruction manual very carefully. These generators are only suitable for air. Do not use pure oxigen.

To ensure a long life of the ozone generator it is important to filter the incoming air to the ozone generator. Make sure that water will not flow into the ozone generator.

If the air has a high humidity use an air dryer before. The dew point may never reach. Otherwise condensation water will reach the unit and lowers the performance - or may induce defects.

Principally you may operate the ozone generator with pressure or vacuum (see sketch below).

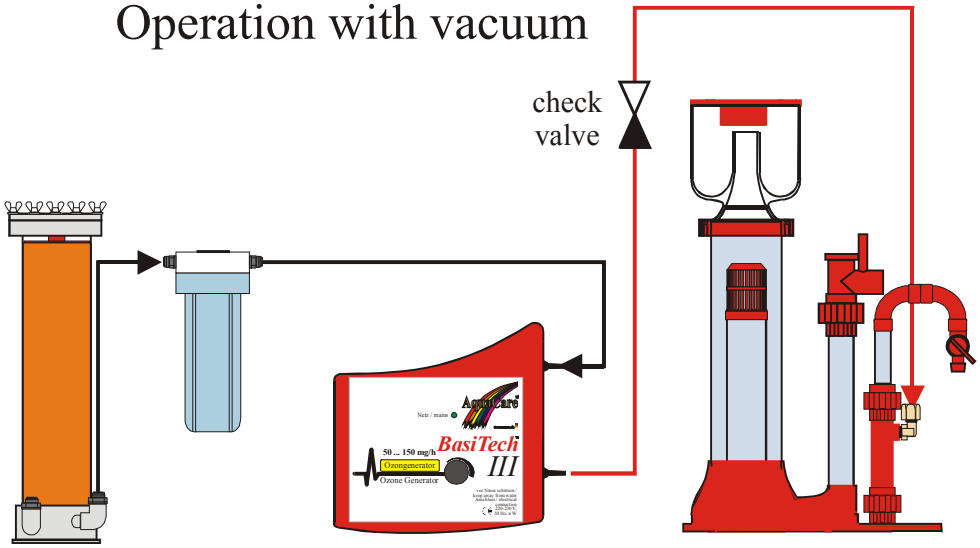
Operation with pressure



air dryer LTM | combi filter or sediment filter | ozone generator OG | ozone reactor OZR

The pressure operation is suitable for ozone reactors (clearing ponds and pools) or skimmers with air wood. An air pump provides the air dryer (e.g. LTM) with air. Then the dried air is filtered by an sediment or combi filter. The particle free air is pumped through the ozone generator and will reach the ozone reactor or skimmer with air wood. Install a check valve or realize an safety loop between ozone generator and ozone consuming unit to make sure that water will not flow back to the ozone generator.

Operation with vacuum

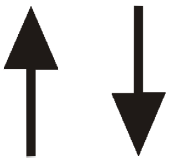


air dryer LTM | combi filter or sediment filter | ozone generator OG | skimmer ACF, type V

For vacuum operation you not need an air pump. The injector (venturi) or dispergator is sucking air by itself. If the incoming air flow is too low due to a too high resistance you may use an additional pump. The sketch will be the same as operation with pressure. In any case a safety loop or a check valve must be installed.

Air Dryer Module LTM

AquaCare GmbH & Co. KG
www.aquacare-shop.de
www.aquacare.de • info@aquacare.de



- increases the ozone output of an ozone generator when the air is too moist

The ozone output of an ozone generator depends, among other things, on the humidity of the air: the more humid the air is, the worse the unit works. If the air is very humid, as frequently happens in aquarium basements, or if the ozone generator is too small, the performance can be increased by connecting the AquaCare LTM air dryer module upstream. The LTM is filled with drying beads and dehumidifies the air flowing through it. The module is designed to be airtight for maximum performance. A quick exchange of the material allows a quick maintenance.

Aqua-Care's 2...5 mm drying beads are made of silicon oxide (amorphous silica) and contain 17% moisture indicator (no cobalt blue!), which quickly indicates the condition of the beads. Once the drying performance has been exhausted, the pearls can be regenerated at least 10 times in the oven.

Technical data of the AquaCare Air Dryer Module LTM 50 ... 70:

Type	LTM 50			LTM 70		
Order number	LTM50-40	LTM50-70	LTM50-100	LTM70-45	LTM70-70	LTM70-100
Diameter in mm	50			70		
Maximum size of the ozone unit in mg/h, approx.	30	60	90	60	110	160
Length in cm*	40	70	100	45	70	100
Necessary height in cm	+5					
Usable volume in litres	0.5	1.0	1.5	1.1	1.8	2.7
Footprint width × depth in cm	14 × 10					
Total weight with filling in kg	1.1	1.6	2.0	2.1	2.8	3.8
Erection	External, in the filter sump, with Hang-On bracket to the aquarium or filter basin, with wall brackets to a wall					
Materials	PMMA (Acrylic glass), NBR, silicone, PVC					
Connectors	1/4", 8 mm nozzle			PVC d20, 12 mm nozzle		
Basis model	Multi Function Filter MF_2			PMMA Filter 70		
Substrate	AquaCare air dryer pearls H_2O-X-Globuli with indicator					

* For larger models or special designs please contact us.

Technical data of the AquaCare Air Dryer Module LTM 100 ... 150:

Type	LTM 100			LTM 150		
Order number	LTM100-50	LTM100-70	LTM100-100	LTM150-40	LTM150-70	LTM150-100
Diameter in mm	100			150		
Maximum size of the ozone unit in mg/h, approx.	150	230	350	330	520	800
Length in cm*	50	70	100	50	70	100
Necessary height in cm	+5					
Usable volume in litres	2.5	3.8	5.8	5.5	8.7	13.4
Footprint width × depth in cm				31 × 22		
Total weight with filling in kg	3.5	4.7	6.6	8	12	15
Erection	External, in the filter sump, with Hang-On bracket to the aquarium or filter basin, with wall brackets to a wall					
Materials	PMMA (Acrylic glass), NBR, silicone, PVC					
Connectors	PVC d20, 16 mm nozzle			PVC d25, 25 mm nozzle		
Basis model	PMMA Filter 100			PMMA Filter 150		
Substrate	AquaCare air dryer pearls H_2O-X-Globuli with indicator					

* For larger models or special designs please contact us.

Drying pearls: H_2O-X-Globuli

The AquaCare drying agent increases the performance of e.g. ozone devices by drying the supplied air.

Application:

Only use the drying agent in airtight flow-through columns, e.g. in the AquaCare MF_2 multifunction filter or in the LTM air drying module. The air to be dried must pass through the drying column. If the blue indicator beads turn red over time, the drying agent can be regenerated again.

Regeneration:

Remove the exhausted drying agent, spread it on a large surface (e.g. baking tray) and dry it in the oven for 1...2 hours at 130...140°C. After drying, the drying agent should be cooled briefly and immediately stored in the drying column in an airtight place. Do not overheat: otherwise the indicator will be destroyed.

Technical data:

Order number	1 litre: 577-001
Material	Silicon oxide (amorphous silica)
Bulk density	0.75 kg / l
Percentage of indicator pearls	17%
Regeneration frequency	at least 10 times

CO_2 Adsorber for skimmers

AquaCare GmbH & Co. KG
www.aquacare.de • e-mail: info@aquacare.de

- Removes carbon dioxide (CO_2) from the skimmer supply air
- slightly increases the pH value of the aquarium water
- simple and safe to use

The pH value is a **central parameter** for an optimum reef aquarium. If this value is too low (temporarily below 8.0), the following symptoms may occur:

- excessive growth of green algae
- mass propagation of cyanobacteria (blue-green algae)
- orientation problems of coral fish
- changes in the behaviour of fish and invertebrates
- only moderate growth of hard corals

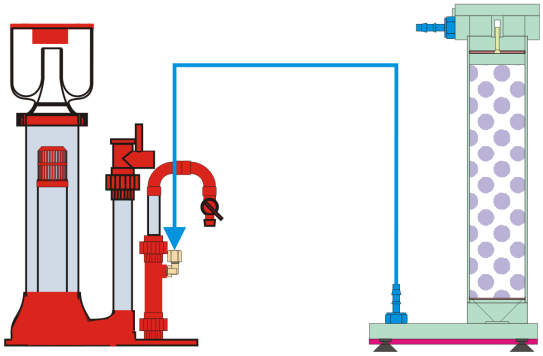
Often enough, the pH value that is too low is caused by a too low carbonate hardness (alkalinity). Also "gamble corner" caused by dirt deposits or compacted soil layers can reduce the pH value. The following steps should be taken before use of a CO_2 adsorber:

- increase the carbonate hardness to at least 7°KH;
- Inspection and, if necessary, remediation of the substrate;
- good current everywhere in the aquarium.

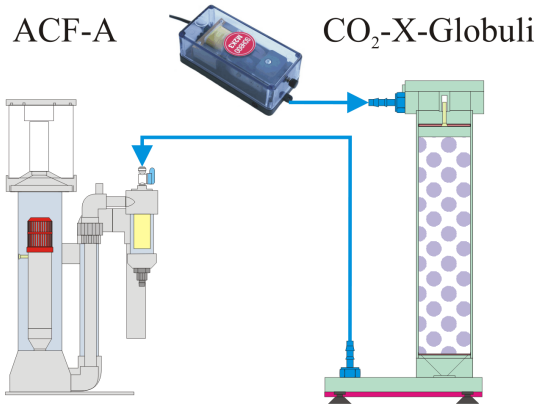
If all these efforts have not been successful, the CO_2 adsorber should be used.

The AquaCare **CO_2-Adsorber** is filled with **CO_2-X globules**. The filter is connected to the air inlet of a skimmer:

ACF-V



ACF-A



The intake air flows through the CO_2 adsorber (**upstream**: from bottom to top, or **downstream**: from top to bottom) and is freed of carbon dioxide. The air reaches the skimmer and cannot form carbon dioxide, which lowers the pH value of the aquarium water. As a result, the pH value in the aquarium rises slightly.

Top: exhausted CO_2-X-Globuli; bottom: new material

If the CO_2 adsorber is used in combination with an **air dryer module (LTM)**, it must be ensured that the air dryer is connected downstream of the CO_2 adsorber - otherwise the CO_2-X globules could overheat.
When the **capacity** of the CO_2 adorber is exhausted, the CO_2-X globules turn slightly violet and the material must be replaced. The material must be replaced even after subsequent decolouration! The used material can be disposed of with household waste.

Technical data of the CO_2 adsorber: 50 - 70

Size	**CO_2-Adsorber-050**			**CO_2-Adsorber-070**		
Order number	CO2-Adsorb-050-40	CO2-Adsorb-050-70	CO2-Adsorb-050-100	CO2-Adsorb-070-45	CO2-Adsorb-070-70	CO2-Adsorb-070-100
Maximum aquarium size in litres*	130	250	380	260	450	680
Life span of a filling *	approx. 4 weeks					
Diameter of the filter in mm	50			70		
Height of the filter in cm **	40	70	100	45	70	100
Necessary height in cm	+5 cm					
Useful volume in litres	0.5	1.0	1.5	1,1	1,8	2,7
Footprint in cm	140 × 100					
Total weight in kg	1.2	1.7	2.2	2,2	3,0	4,0
Erection	External, in the filter sump, with Hang-On bracket to the aquarium or filter basin, with wall brackets to a wall					
Materials	high-quality PMMA (acrylic glass), NBR, silicone, PA					
Connections: female thread - nozzle	G1/4", 8 mm nozzle			d20 or nozzle 12		
Temperature range	10 ... 40°C					
Pressure range	500 ... 1200 hPa					
Relative humidity	20 ... 100%					
Basic model	MF_2 MultiFunctionFilter 50			PMMA empty filter		
Substrate	CO_2-X-Globuli					

* The maximum aquarium size depends on the type and effectiveness of the skimmer, the carbonate hardness in the aquarium water, the CO_2 concentration in the room and the desired replacement interval of the CO_2-X globules. In individual cases a deviation may make sense - please contact us.
** For larger CO_2 adsorbers filters with more volume, please ask us.

Technical data of the CO_2 adsorber: 100 - 150

Size	**CO_2-Adsorber-100**			**CO_2-Adsorber-150**		
Order number	CO2-Adsorb-100-50	CO2-Adsorb-100-70	CO2-Adsorb-100-100	CO2-Adsorb-150-50	CO2-Adsorb-150-70	CO2-Adsorb-150-100
Maximum aquarium size in litres*	610	950	1450	1400	2200	3400
Life span of a filling *	approx. 4 weeks					
Diameter of the filter in mm	100					
Height of the filter in cm **	50	70	100	50	70	100
Necessary height in cm	+5 cm					
Useful volume in litres	2.5	3.8	5.8	5.5	8.7	13.4
Footprint in cm	210 × 140			310 × 220		
Total weight in kg	3.7	5.1	7.1	9	12	16
Erection	External, in the filter sump, with Hang-On bracket to the aquarium or filter basin, with wall brackets to a wall					
Materials	high-quality PMMA (acrylic glass), NBR, silicone, PVC					
Connections: female thread - nozzle	PVC20, 16 mm nozzle			PVC25, 25 mm nozzle		
Temperature range	10 ... 40°C					
Pressure range	500 ... 1200 hPa					
Relative humidity	20 ... 100%					
Basic model	PMMA empty filter d100			PMMA empty filter d150		
Substrate	CO_2-X-Globuli					

* The maximum aquarium size depends on the type and effectiveness of the skimmer, the carbonate hardness in the aquarium water, the CO_2 concentration in the room and the desired replacement interval of the CO_2-X globules. In individual cases a deviation may make sense - please contact us.
** For larger CO_2 adsorbers filters with more volume, please ask us.


corrosive:

CO_2-X-Globuli: Causes skin irritation; Causes severe eye damage; Must not get into children's hands; Read label before use; Do not breathe dust / smoke / gas / mist / vapour / aerosol; Wear protective gloves / clothing / eye protection / face protection; If swallowed: Rinse mouth. Do not induce vomiting; If in contact with skin: Wash with plenty of water; In contact with eyes: Rinse gently with water for several minutes. If possible, remove any contact lenses. Continue rinsing; protect from sunlight; store at temperatures not exceeding 50°C

Multi Function Filter
MF_2

AquaCare GmbH & Co. KG
www.aquacare.de • e-mail: info@aquacare.de

There are different modes of filter operation. Everyone has its pros and cons. For example, it makes sense to operate high-quality phosphate adsorbers in a fluidized bed or in the Vertical Flow Filter (VFF); for other materials such as activated carbon, this mode of operation would not be recommended as the coal would be crushed.
AquaCare has now managed to implement all operating modes with only one filter. This filter can be used in many ways and is prepared for the future. You can easily convert it to another mode.

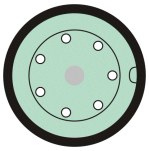
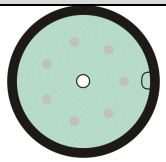
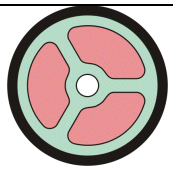
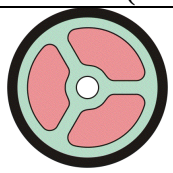
	Upstream: here the water flows from bottom to top through the filter. Suitable for most filter materials. Not maintenance-free!
	Downstream: the water flows from top to bottom; fine filter materials can filter out particles. Not maintenance-free!
	trickling filter: the water trickles in an atmosphere from top to bottom over trickling filter material.
	Moving bed: in the fluidized bed process, the water flows from bottom to top and moves the filter material in order to allow optimum reaction and prevent clogging..
	Circulation filter: here the filter material is conveyed in a central tube from bottom to top; then it falls down again in the outer tube; also called vertical flow filter (VFF).
	Reverses Moving Bed: corresponds to the fluidised bed method, except that filter material is used which is lighter than water.
	Reverse circulation filter: corresponds to the VFF, only with lighter filter material than water.
	Incubation tube (egg tumbler) for eggs for hatching larvae (not included). Not maintenance-free!
	The MF_2 filter can also be equipped as a phytoplankton and zooplankton tube.

The MF_2 filter is made of high quality acrylic glass and can be placed **in the filter sump** as well as **outside the aquarium** (underneath, above or on the side). With the MF_2 holder it can be **hung on or in** the aquarium/filter tank. **Wall mounting** is also possible. The suction feet provide maximum stability. The lid is equipped with the unique **hybrid closure**. It is simply fixed with the integrated magnets - no screwing necessary! For higher pressures or sensitive environments, additional polyamide screws can be added to cover these areas of application. The main pipe can be turned in 90° steps.

Technical data of the MultiFunctionFilter

Type	MF_2-50
Order number	MF2-050-40 (-70; -100)
Effective volume	0.5 (1.0; 1.5) litres
Height	40 (70; 100) cm
Necessary height	+5 cm
Footprint size	14 × 10 cm
Diameter	50 mm
Connectors	1/4" femals thread (8 mm nozzles are scope of delivery)
Functional possibilities (Filter materials are not included and must be ordered separately) * Additional parts are required	Downstream filter, upstream filter, moving Bed, circulation filter / vertical flow filter VFF, trickling filter*, reverse moving bed*, reverse vertical flow filter / RVFF*, egg & larvae incubator*, phytoplankton tube*, zooplankton tube*, air dryer, carbon dioxide adsorber
Scope of delivery	MF_2-50-Filter with suction feed, lid with hybrid closure, upper screen with filter sponge, bottom screen 3 mm and filter sponge, central tube for VFF and RVFF, 8 mm nozzle fittings, stainless steel rod for removing the internal filter parts

Available accessories

 hang-On support	 wall bracket	 Upper sieve plate for trickling filter operation, also reverse fluidized bed (RMB)	 upper sieve plate for reverse circulation filters, also reverse fluidized bed (RMB)
 5 mm screen	 valve 1/4" (practical as drain valve or for fast venting of downstream or trickle filters)	 Incubation tube set: lower sieve **1000 µm** + upper sieve (for large eggs / larvae)	 Incubation tube set: lower sieve **200 µm** + upper sieve (for small eggs / larvae)

Spare parts can be found on the Internet: www.aquacare-shop.de

Maximum aquarium size in litres**

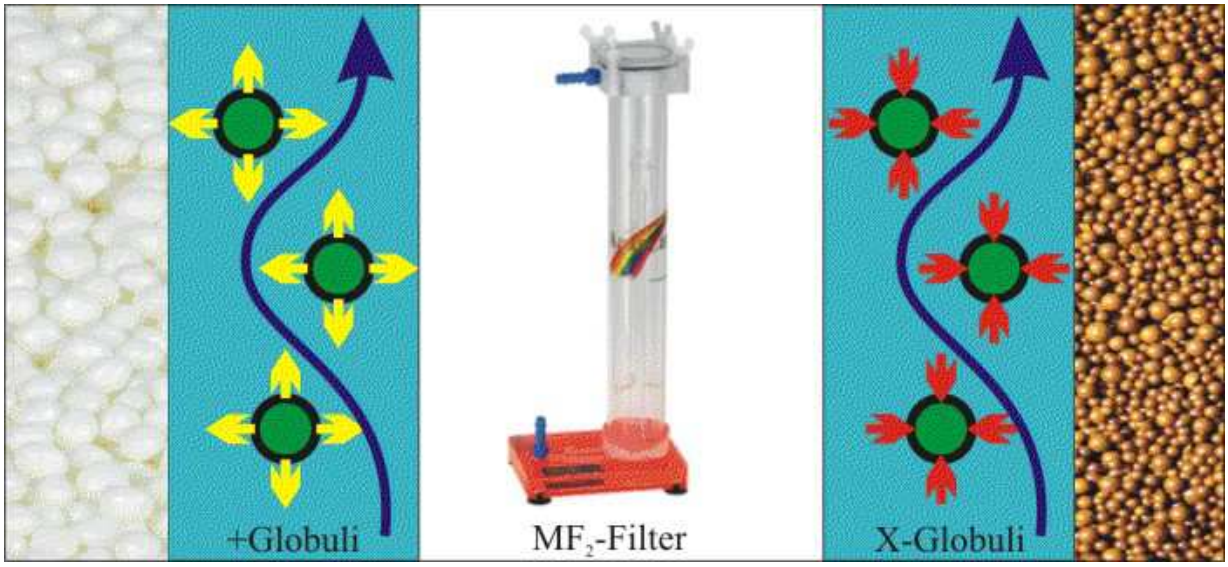
Filter material	MF_2-50	MF_2-70
Quartz sand, Zeolite 0.8-1.5 mm (bio filter)	350	790
Activated carbon filter (pellets)	250	570
Phosphate adsorber, simple	110	250
Phosphate-X-Globuli (high grade adsorber)	110	250
Trickling filter material PE black, sintered glass	50	soon
Sulphur granulate (nitrate filter)	130	soon
Lime material (neutralization of calcium reactor)	50	115
Organic pellets (N-P reduction, Bakterioplankton)	250	570
AquaCare +Globuli (MarineSnow, plankton replacement, coral food, etc.)	100	230

** The maximum aquarium size depends on the type of filtration or filter material. The indicated sizes are guide values for average reef aquariums with live rock and good coral fillings. In individual cases, a variation can make sense - please ask us.

The Globuli-System

Innovative seawater filtration - dosing of valuable particles

AquaCare GmbH & Co. KG
www.aquacare-shop.de
www.aquacare.de
info@aquacare.de



AquaCare has developed an innovative aquarium system for the disposal of waste materials and for the supply with important additives for fish, coral and invertebrates. Now it is even possible to continuously dose solids without great effort. The system is easy to use and effective in performance. The globules intended for the disposal of substances are called **X-globuli**, all others that add substances to water are named **+globuli**.

The heart of the system is the **M**ulti**F**unction**F**ilter - abbreviated MF_2 - which can be used universally for all filtration purposes. The AquaCare globules are best used in the fluidized bed (FB) or in vertical flow filter (VFF) operation. Each sphere is perfectly washed around by the aquarium water, so that the cleaning performance of the X-Globuli or the dissolution speed of the +Globuli is at maximum. The globule filter filling **cannot clog**. You only need to replace the X globules after exhaustion and replenish the +globules as needed.

X-Globuli - remove unwanted substances

Phosphate-X-Globuli:

This **high-performance adsorber** effectively removes phosphate from seawater aquariums. An unintentional desorption (release) of the bound phosphate is not possible. Dosage: 50-100 ml per 100 litres aquarium volume - smaller or larger quantities are possible; the replacement interval is correspondingly shorter or longer. When the maximum accepted phosphate concentration (0.02...0.50 mg/l) in the aquarium is reached again, the X globules must be replaced.

X-Globules must not be mixed with other globules.

CO_2-X globuli

The supply air for a skimmer is passed through a filter filled with CO_2-X globuli and flows through the CO_2 adsorber material. This removes the carbon dioxide and no longer leads to the formation of carbon dioxide in the skimmer, which lowers the pH value. **The pH value in the aquarium water rises slightly**. When the filter material is used up, it turns slightly purple and must be replaced with new CO_2-X globuli. Even after a subsequent decolouration, the material must be replaced!

CO_2-X globules must not be mixed with other globules.

H_2O-X-Globuli (air dryer beads)

The AquaCare H_2O-X-Globuli increase the **performance** of e.g. **ozone devices** by drying the supplied air. Only use the desiccant in airtight columns, e.g. in the AquaCare air drying module LTM or in the multifunction filter MF_2. The air to be dried must be passed through the drying column. If the indicator beads become colourless over time, the drying agent can be regenerated. Do not overheat: otherwise the indicator will be destroyed.

CO_2-X globules must not be mixed with other globules

+Globuli - add important substances to the aquarium

POC+Globuli:

Two applications are possible with these globuli. In aerobic operation (high flow) bacteria grow on the balls and slowly degrade them. Excess bacteria dissolve, are flushed into the aquarium as **bacterioplankton** and taken up by corals and other filtrators. Especially in ultra-low NP aquariums this additional supply of the animals can show impressive results. POC globules (low flow) can also be used in medium to highly contaminated aquariums. However, the effluent water should then be fed into a skimmer to **remove** the absorbed **nitrate and phosphate** from the system. Dosage: 50-200 ml per 100 litres aquarium volume - more possible with high NP-load; refill the filter every few months.

These +globuli should not be mixed with other +Globuli.

MarineSnow+Globuli:

A perfect mixture of inorganic carrier structure and bound organic compounds is released into the aquarium water by these globules. This simulates the continuous input of the so-called marine snow (sea snow) into the ocean. Corals and filter feeders absorb these particles and use the compounds in them for better growth. These +globules should not be used in aquariums with very high concentrations of nitrate and phosphate. Dosage: every week 10-100 ml per 100 litres of aquarium water; the +globules dissolve after a few days. In Ultra-Low-NP aquariums the AminoVit+Globuli should be used additionally.

These +Globuli should be stored in the refrigerator at 2...6°C.

Algae+Globuli:

The organic matrix contains microalgae and cyanobacteria. During dissolution, the organisms are released and made available to the filtering organisms as phytoplankton substitutes. These +globules should not be used in aquariums with very high loads.

Dosage: every week 10-100 ml per 100 litres of aquarium water; the +globules dissolve after a few days.

These +globules should be stored in the refrigerator at 2...6°C.-

The following Algae+Globuli are currently available:

***Spirulina*+Globuli:** 5-40 µm small cyanobacterium with valuable ingredients; well suited as phytoplankton substitute

soon

Chlorella*+Globuli*: 2-10 µm small microalgae; well suited as phytoplankton substitute

soon

AminoVit+Globuli:

These protein, amino acid and vitamin containing globules supply ultra-low NP aquariums with important organic substances. Dosage: every week 10-100 ml per 100 litres of aquarium water; the +globules dissolve after a few days. In NP-heavy loaded aquariums the MarinSnow+Globuli should be used better.

These +globules should be stored in the refrigerator at 2...6°C.-

The Fluidized Bed Filter FBF

AquaCare GmbH & Co. KG
www.aquacare-shop.de
www.aquacare-shop.de • e-mail: info@aquacare.de

- Oxidation of the organic waste materials of an aquarium
- Nitrification (detoxification of ammonia)
- easy and safe to use
- constant degradation performance
- maintenance-free (no clogging)
- with quartz sand or POC+Globuli for filtration
- with +Globuli for dosing additives

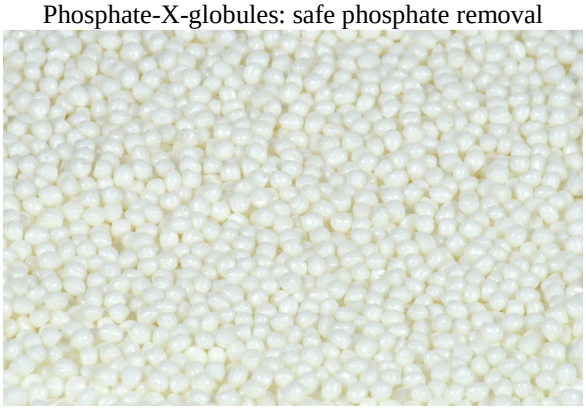
FBF 50-40 with quartz sand FBF300-500

Fluidized bed filters (FBF) can be operated with **extremely fine filter material** without clogging. Even materials that stick together over time can be operated in the fluidized bed without any major maintenance effort. The constantly moving filter material ensures that old and useless bacterial films are removed and only active biofilms remain in the filter. The material no longer sticks together - bacterial layers can no longer block the filter. This ensures a constant and extremely high degradation performance. It is important that the filter is only about 70% filled with the filter material, because the filter bed must expand during operation.

The smallest FBF of AquaCare consists of the universal multifunctional filter MF2. The larger filters consist of the PMMA empty filter (except FBF75, FBF250) and can be used similarly due to the exchangeable filter inserts. The larger filters (from FBF100) are operated with a deflector plate, so that the inflow is prevented from becoming overgrown with bacteria (under normal aquarium conditions). The inlet geometry is designed in such a way that when the water flows back (e.g. in the event of a power failure), the filter material is not carried along so easily and the inlet pipe is clogged. A non-return valve in the inlet can be dispensed with if the material is coarser. If AquaCare quartz sand is used, a non-return valve should be installed in the inlet.

With AquaCare+Globuli, additives such as plankton, artificial sea snow, carotenoids, amino acids, proteins and much more can be continuously dosed.

Phosphate-X-globules: safe phosphate removal



POC+Globuli: the biopellets from AquaCare

Phosphate X globules are a fast and safe method of lowering the phosphate concentration to a low level.

The POC+Globuli (Biopellets) ensure a healthy development of the bacterial population and can lower phosphate and nitrate depending on the operating mode.

Quartz sand creates an enormously large surface area which ensures sufficient biofiltration in pure fish or breeding facilities.

The effective inlet system for the formation of a fluidized bed

Fine quartz sand provides a large bioavailable surface

Technical data of the AquaCare Fluidized Bed Filter FBF50 ... FBF75:

Size	**FBF 50**			**FBF 70**		
Order number	FBF50-40	FBF50-70	FBF50-100	FBF70-45	FBF50-70	FBF70-100
Diameter in mm	50			70		
Total height in cm*	40	70	100	45	70	100
Necessary height in cm	+ 5 cm					
Useful volume in litres	0.5	1.0	1.5	1.1	1.8	2.7
Useful volume fluidized bed in litres	0.4	0.7	1.0	0.7	1.3	1.9
Maximum aquarium size in litres, ca. quartz sand: AquaCare+Globuli:	 360 100	 710 200	 1000 300	 800 210	 1200 360	 1900 540
Recommended flow in l/h quartz sand: leichte +Globuli	 50...90 17...25			 120...190 37...55		
Footprint width × depth in cm	14 × 10			19 × 14		
Empty weight in kg	0.7	0.8	0.9	1.2	1.5	1.7
Erection	External, in the filter sump, with Hang-On holder to the aquarium or filter tank, with wall holders to a wall					
Materials	PMMA (Acrylic glass), NBR, silicone, PVC, PA					
Connectors**	G1/4" - 8 mm			20 mm PVC Fittings, 12 mm hose nozzle		
Drain valve	mounting possible					
Basic model	MultiFunctionFilter MF_2			PMMA empty filter		
Substrates	Please select the desired substrate for the AquaCare FBF					

* special heights are possible! ** others possible

Technical data of the Fluidized Bed Filter FBF100 ... FBF150:

Size	FBF 100			FBF150		
Order number	FBF-100-50 FBF-100-70 FBF-100-100			FBF-150-50 FBF-150-70 FBF-150-100		
Diameter in mm	100			150		
Total height in cm*	50	70	100	50	70	100
Necessary height in cm	+ 5 cm					
Useful volume in litres	2.5	3.8	4.8	5.5	8.7	13.4
Useful volume fluidized bed in litres	1.7	2.6	4.0	3.9	6.1	9.4
Maximum aquarium size in litres, ca. quartz sand: AquaCare+Globuli:	 1700 490	 2700 770	 4200 1200	 3800 1100	 6000 1700	 9500 2700
Recommended flow in l/h quartz sand: leichte +Globuli	 210...350 66...100			 510...870 160...240		
Footprint width × depth in cm	21 × 14					
Empty weight in kg	1.7	1.9	2.3	3,9	4.2	4,7
Erection	External, in the filter sump, with Hang-On holder to the aquarium or filter tank, with wall holders to a wall					
Materials	PMMA (Acrylic glass), NBR, silicone, PVC, PA					
Connectors**	20 mm PVC fittings, 16 mm hose nozzle			25 mm PVC fittings 25 mm hose nozzle		
Drain valve	G1/4"-6/4					
Basic model	PMMA empty filter, but with FBF screen					
Substrates	Please select the desired substrate for the AquaCare FBF					

* special heights are possible! ** others possible

Technical data of the Fluidized Bed Filter FBF250 ... FBF300:

Size	FBF 250	FBF300		
Order number	375-025	FBF-300-500 FBF-300-1000 FBF-300-1500		
Diameter in mm	250	300		
Total height in cm*	100	50	100	150
Necessary height in cm	+5 cm			
Useful volume in litres	35	22	55	88
Useful volume fluidized bed in litres	25	15	38	62
Maximum aquarium size in litres, ca. quartz sand: AquaCare+Globuli:	 18 7	 11 4,4	 27 11	 44 18
Recommended flow in l/h quartz sand: leichte +Globuli	 1.5...2.4 0.3...0.7	 2.1...3.4 0.7...1.0		
Footprint width × depth in cm	43 × 37	50 × 38		
Empty weight in kg	40	15	18	21
Erection	External, in the filter sump			
Materials	PVC (transparent), PVC, NBR, ABS	PMMA (Acrylic glass), NBR, silicone, PVC, PA		
Connectors**	32 mm PVC fittings	40 mm PVC fittings		
Drain valve	PVC20	1/2"-16		
Basic model	PVC empty filter	PMMA empty filter		
Substrates	Please select the desired substrate for the AquaCare FBF			

* special heights are possible! ** others possible

Our technical FBF units made of polyethylene are also available for high-performance systems such as aquaculture plants.

POC Filter (Pellet Filter)

AquaCare GmbH & Co. KG
www.aquacare-shop.de
www.aquacare.de • info@aquacare.de

- Nitrate & phosphate removal without control technology
- produces bacterioplankton
- easy and safe to use

The filter material consists of a polymer that can be slowly degraded by bacteria. This material is **p**articulate **o**rganic **c**arbon - the abbreviation for this is POC. During the degradation process, these microorganisms **absorb nitrogen as nitrate and phosphorus as phosphate** and can remove them from the water. The excess bacteria serve as **bacterioplankton** (in ultra-low-NP aquariums) when the filter drain is returned to the aquarium. In aquariums with too much nitrate and phosphate, the filter drain should be directed into the skimmer inlet to remove the bacteria containing the bound nitrate and phosphate.

The biopolymer POC+Globuli dissolves completely and only needs to be refilled every few months.

Technical data of the AquaCare pellet filter POC 50 ... POC 70:

Size	**POC 50**			**POC 70**		
Order number	POC50-40	POC50-70	POC50-100	POC70-45	POC70-70	POC70-100
Diameter in mm	50			70		
Total size in cm*	40	70	100	45	70	100
Necessary height in cm	+ 5 cm					
Usable volume in litres	0.5	1.0	1.5	1.1	1.9	2.7
max. aquarium size in litres, approx. **	250	500	750	530	900	1300
Flow in l/h***	25			45		
footprint width × depth in cm	14 × 10			18 × 14		
Total weight in kg	1.1	1.5	1.8	1.9	2.5	3.2
Erection	External, in the filter sump, with Hang-On holder to the aquarium or filter tank, with wall holders to a wall					
Materials	PMMA (Acrylic glass), NBR, silicone, PVC, PA					
Connectors**	G1/4" - 8 mm			20 mm PVC Fittings, 12 mm hose nozzle		
Drain valve	Mounting possible					
Base model	Multi Function Filter MF_2 50			PMMA empty filter 70		
Substrate: AquaCare POC+Globuli	1 litre: Glo-Poc-010					

* Special heights are possible
** larger filters can also be used - the ideal size depends very much on the aquarium type
*** when using AquaCare-POC+Globuli

Technical data of the AquaCare pellet filter POC 100 ... POC 150:

Size	POC 100			POC 150		
Order number	POC-100-50 POC-100-70 POC-100-100			POC-150-50 POC-100-70 POC-100-100		
Diameter in mm	100			150		
Total size in cm*	50	70	100	50	70	100
Necessary height in cm	+ 5 cm					
Usable volume in litres	2.5	3.8	5.8	5.4	8.5	13.3
max. aquarium size in litres, approx. **	1200	1900	2900	2700	4300	6600
Flow in l/h***	100			240		
footprint width × depth in cm	21 × 14			26 × 20		
Total weight in kg	3.0	6.8	8.8	6.8	8.8	12
Erection	External, in the filter sump, with Hang-On holder to the aquarium or filter tank, with wall holders to a wall					
Materials	PMMA (Acrylic glass), NBR, silicone, PVC, PA					
Connectors**	20 mm PVC fittings, 16 mm hose nozzle			25 mm PVC fittings		
Drain valve	G1/4"-6/4			1/2"-16		
Base model	PMMA empty filter					
Substrate: AquaCare POC+Globuli	1 litre: Glo-Poc-010					

* Special heights are possible
** larger filters can also be used - the ideal size depends very much on the aquarium type
*** when using AquaCare-POC+Globuli

Technical data of the AquaCare pellet filter POC 250 ... POC 300:

Size	POC 250			POC 300	
Order number	POC250			POC-300-500 POC -300-1000 POC -300-1500	
Diameter in mm	250			300	
Total size in cm*	100			50	100	150
Necessary height in cm	+5 cm				
Usable volume in m^3	24			22	55	88
max. aquarium size in m^3, approx. **	12			11	27	44
Flow in m^3/h***	0.7			1.0	
footprint width × depth in cm	43 × 37			50 × 38	
Total weight in kg						
Erection	External, in the filter sump				
Materials	PVC (transparent), PVC, NBR, ABS			PMMA (Acrylic glass), NBR, silicone, PVC, PA	
Connectors**	32 mm PVC fittings			40 mm PVC fittings	
Drain valve	PVC20			1/2"-16	
Base model	PVC empty filter			PMMA empty filter	
Substrate: AquaCare POC+Globuli	1 litre: Glo-Poc-010				

* Special heights are possible
** larger filters can also be used - the ideal size depends very much on the aquarium type
*** when using AquaCare-POC+Globuli

Autotrophic
De-Nitrification Reactor: ADN
- the safe nitrate filter -

AquaCare GmbH & Co. KG
www.aquacare-shop.de • info@aquacare.de

Nitrate will accumulate in aquaria very fast if you feed many fishes. Concentrations over 20 mg/l (ppm) should not be tolerated. The AquaCare ADN filter is very safe because the speciallized bacteria reduce the nitrate autotrophically. This means that organic feeding substance are not necessary – the bacteria population growths on a special suphur substrate. The AquaCare ADN filter has follwing advantages:

If you feed corals like *Tubastrea* spec. much nitrate will accumulate. So nitrate elimination is necessary.

- intensive mixing with a rigid circulation pump – therefore the efficiency will rise
- high water inlet flows are possible
- long life of the sulphur substrate
- easy de-aeration
- low biomass production – therefore low organic pollution in the aquarium water

Technical data of the AquaCare ADN filter: 70 ... 100

Size	**ADN 70**	**ADN 100**
Bestellnummer	ADN-70-45 ADN-70-70 ADN-70-100	ADN100-50 ADN100-70 ADN100-100
Maximum aquarium size in litres	1,000 / 1,800 / 2,700	2,400 / 3,700 / 5,700
Diameter in mm	70	100
Sulfur substrate in kg	1.3 / 2.1 / 3.2	2.5 / 3.8 / 5.8
Total height in cm*	45 / 70 / 100	50 / 70 / 100
Necessary height*	+ 5 cm	
Foot print size, L × W in mm	0 ×	220 × 180
Erection	external or in the filter sump, hang-on, wall mounting	
Materials	PMMA, NBR o-rings, PA+PVC connectors	
Inlet connection	4 mm nozzle	
Outlet connection	10 mm nozzle	
Drain valve	no (can be retrofitted)	Valve for 6/4 PE hose
Build in pump	ADN70-45: UP300 (4W)	ADN100-50: UP1000 (10W) ADN100-70: UP1000 (10W) ADN100-100: UP2000 (18W)
Filter material	sulphur granules (99.8% purity), refillable	
Optimum water flow in l/h	2.7 / 5.4 / 8.1	7.4 / 11.3 / 17.3
Maximum water flow in l/h	11 / 22 / 33	29 / 45 / 69
Total weight in kg		5 / 7 / 11
pH value of water outlet	0.5-1.0 pH steps lower than inlet / carbonate hardness of min. 7°dKH is required! The pH value should not be lower than 8.0. A neutralization filter can be connected downstream.	
erforderliche Zulaufpumpe	Circulation pump with ball valve or dosing pump or solenoid valve	
Redox-Messkettenanschluss	For all probes with 12 mm diameter (option), order number: Con20x1.5-12mm	
1 1 liter (approx. 1.2 kg) sulphur granules (99.8% pure), order number: 575-010 25 kg (approx. 21 liters) sulphur granules (99.8% pure), order number 575-250		

Technical data of the AquaCare ADN filter: 150 ... 250

Size	ADN150-50	ADN150-70	ADN150-100	ADN 250
Order number	ADN150-50	ADN150-70	ADN150-100	300-025
max. aquarium size	5,400	8,500	13,200	21,000
Diameter, mm	150			250
Sulfur substrate, litres	5.4	8.5	13.3	26
Height total, cm*	50	70	100	77
Minimum space for filter*	+5 cm			
Foot print size, L × W, mm	310 × 280			430 × 400
Location	extern or in the filter sump, hang-on (not d250), wall mounting (not d250)			
Materials	PVC, PMMA, NBR o-rings, PA connectors			
Inlet connection	4 mm nozzle			PVC d20
Outlet connection	12 mm nozzle			PVC d20
drain	valve for PE 6/4 hose			PVC ball valve d20
Build in pump	UP2000 (18 W)	UP2000/1 (33W)		UP3000 (45 W)
Filter material	sulphur granules (99.8% purity), refillable			
Optimum water flow, l/h	16	26	40	60
max. water flow, l/h	64	102	160	300
total weight, kg	12	18	23	45
pH value of water outlet	0.5-1.0 pH steps lower than inlet / carbonate hardness of min. 7°dKH is required! The pH value should not be lower than 8.0. A neutralization filter can be connected downstream.			
Water inlet pump	Circulation pump with ball valve or dosing pump or solenoid valve			
Redox (ORP) probe connector	For all probes with 12 mm diameter (option), order number: Con20x1.5-12mm			
1 liter (approx. 1.2 kg) sulphur granules (99.8% pure), order number: 575-010 25 kg (approx. 21 liters) sulphur granules (99.8% pure), order number 575-250				

* special sizes are possible! When using redox electrodes, the required height increases by approx. 10 cm

Technical de-nitrification filter systems are available, too.

Possibilities of phosphate removal

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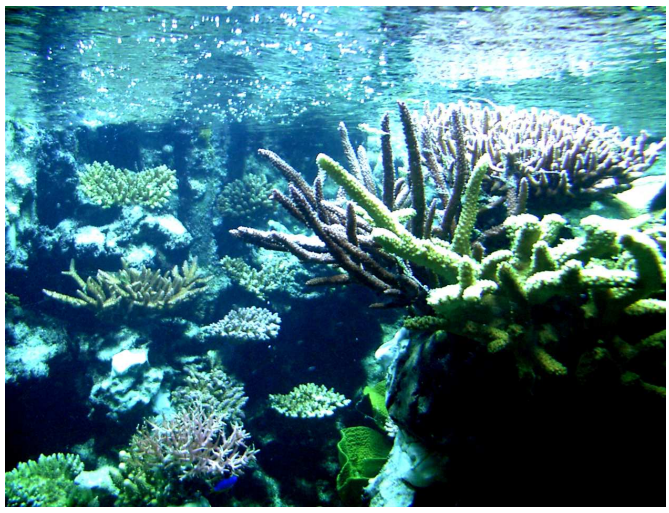
Phosphate (chemical formula PO4) is an important nutrient in marine aquariums. The concentration should be maintained between **0.05 and 0.20 mg/l PO_4**. In this interval most animals can prosper well.

Under this concentration range one speaks of **Ultra-P-Aquariums**. In these, the sessile animals (e.g. corals) must be supplied with additional phosphate, especially if the carbonate hardness is above 8°dH. The phosphate increase can be achieved by increased feeding with fish feed, food for filtering animals, substitute plankton and plankton. Alternatively, the phosphate concentration can be carefully raised with suitable care solutions.

However, there is usually **far too much** phosphate in the water. In order to successfully care for sensitive hard corals, the concentration must be reduced to the optimum. There are several ways to do this.

- More water change with phosphate-free water
- Use of a lime water reactor
- More phosphate consumers: corals, algae sanctuary
- mMore light so that the corals can consume more phosphate
- Reduction of fish stock
- Use of high-quality feed
- Use of precipitants (can lead to fish losses)
- Use of a fleece filter
- Use of a pellet filter (POC filter), in which the produced bacteria are removed from the aquarium
- Use of phosphate adsorbers:



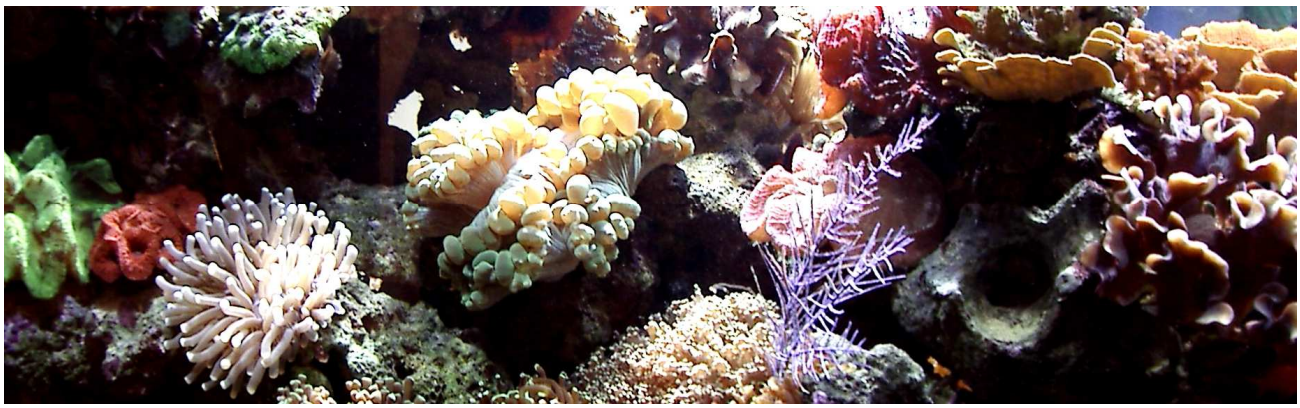
AquaCare offers two different phosphate adsorbers:

1. 

   The iron-based **phosphate adsorber** with an excellent price-performance ratio. This granulate should be used in the **upstream process**, i.e. the water flows through the filter from bottom to top without the granules moving. Before use, the material should be rinsed slightly to prevent discoloration of the water.

2. 

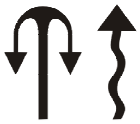
   The special granulate **Phosphate-X-Globuli**. This high-tech product reduces the phosphate concentration without abrasion and discoloration. The material can be used in **fluidized bed or circulating filters** to prevent clogging and maximize efficiency. The material is absolutely dust-free due to the special manufacturing process. Lower phosphate values can be achieved than with simple phosphate adsorbers. As a "side effect", silicate is also removed from the aquarium water. In particular**, high-quality energy-saving pumps**, which are very sensitive to iron-based adsorber dust, play out the Phosphate-X-Globuli their full advantages.



Phosphate Adsorbing Filter

- removes excess phosphate
- great effectiveness
- simple and safe
- economical to use
- the optimum operating mode for the respective material can be selected

Technical data of the AquaCare Phosphate Adsorber Filter 50 - 100:

Type with simple Adsorber	**PO4-50**	**PO4-70**	**PO4-100**
Type with high-end Adsorber	**PO4-X-50**	**PO4-X-70**	**PO4-X-100**
Diameter in mm	50	70	100
Max. aquarium size in litre*, approx.	150 (220; 320)	190 (390; 580)	530 (920; 1350)
Max. flow for simple adsorber	11 l/h	20 l/h	43 l/h
Flow for high-end adsorber	22...30 l/h	40...55 l/h	86...119 l/h
Suitable pump (not scope of delivery)	aquabee UP300		UP500
Height in cm**	40 (70; 100)	45 (70; 100)	50 (70; 100)
Necessary height in cm	+5		
Useable volume in litres (moving bed)	0.5 (0.7; 1.1)	0.8 (1.3; 1.9)	1.8 (2.7; 4.1)
Footprint width × depth in cm	14 × 10	18 × 14	21 × 14
Total weight with filling (dry)	1.1 (1.6; 1.7)	1.9 (2.5; 3.3)	3.1 (4.1; 5.6)
Erection	Externally, in the filter sump, with Hang-On holder to the aquarium or filter basin, with wall brackets on a wall		
Operation mode with simple adsorber 	 **Upstream process**: the water flows from bottom to top, without moving of the material		
Operation mode with Phosphat-X-Globuli 	 **Fluidized bed processes:** the water flows from bottom to top so that the particles move. The vertical flow process (MF_2 only) is also possible		
Materials	PMMA (Acrylic glass), NBR, silicone, PVC, PA		
Connections: female thread - nozzle	G1/4" - 8 mm	PVC 20, nozzle 16	PVC 20, nozzle 16
Base model	MF_2 filter 50	PMMA filter 70	PMMA filter 100

* The maximum aquarium size has been calculated so that the material lasts for at minimum 8 weeks; smaller filters can also be used for large aquariums; the material must therefore be changed more often.

** special heights are possible

Technical data of the AquaCare Phosphate Adsorber Filter 150 - 300:

Type with simple Adsorber	**PMF-150**	**PMF-250**	**PMF-300**
Type with high-end Adsorber	**PMF-X-150**	**PMF-X-250**	**PMF-X-300**
Diameter in mm	150	250	300
Max. aquarium size in litre*, approx.	1.3 (1.9; 2.9)	7.6	4.7 (11.7; 18.9)
Max. flow for simple adsorber	100 l/h	300 l/h	430 l/h
Flow for high-end adsorber	205...285 l/h	590...820 l/h	860...1200 l/h
Height in cm**	50 (70; 100)	100	50 (100; 150)
Necessary height in cm	+5		
Useable volume in litres (moving bed)	5.8 (9.0; 13.7)	35	22 (55; 88)
Footprint width × depth in cm	31 × 22	37 × 30	50 × 38
Total weight with filling (dry)	7.1 (9.3; 12.6)	41	35 (57; 80)
	Externally, in the filter sump		
Operation mode with simple adsorber 	 **Upstream process**: the water flows from bottom to top, without moving of the material		
Operation mode with Phosphat-X-Globuli 	 **Fluidized bed processes:** the water flows from bottom to top so that the particles move. The vertical flow process (MF_2 only) is also possible		
Materials	PMMA (Acrylic glass), NBR, silicone, PVC, PA		
Connectors PVC unions	d25 mm	d32 mm	d40 mm
Base model	PMMA150	PVC250	PMMA300

* The maximum aquarium size has been calculated so that the material lasts for at minimum 8 weeks; smaller filters can also be used for large aquariums; the material must therefore be changed more often.

** special heights are possible

Phosphate-$X_{globuli}$

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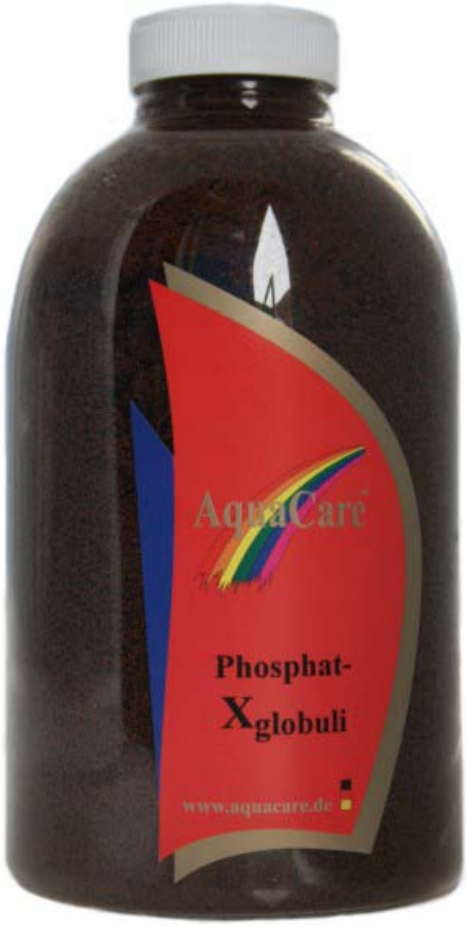
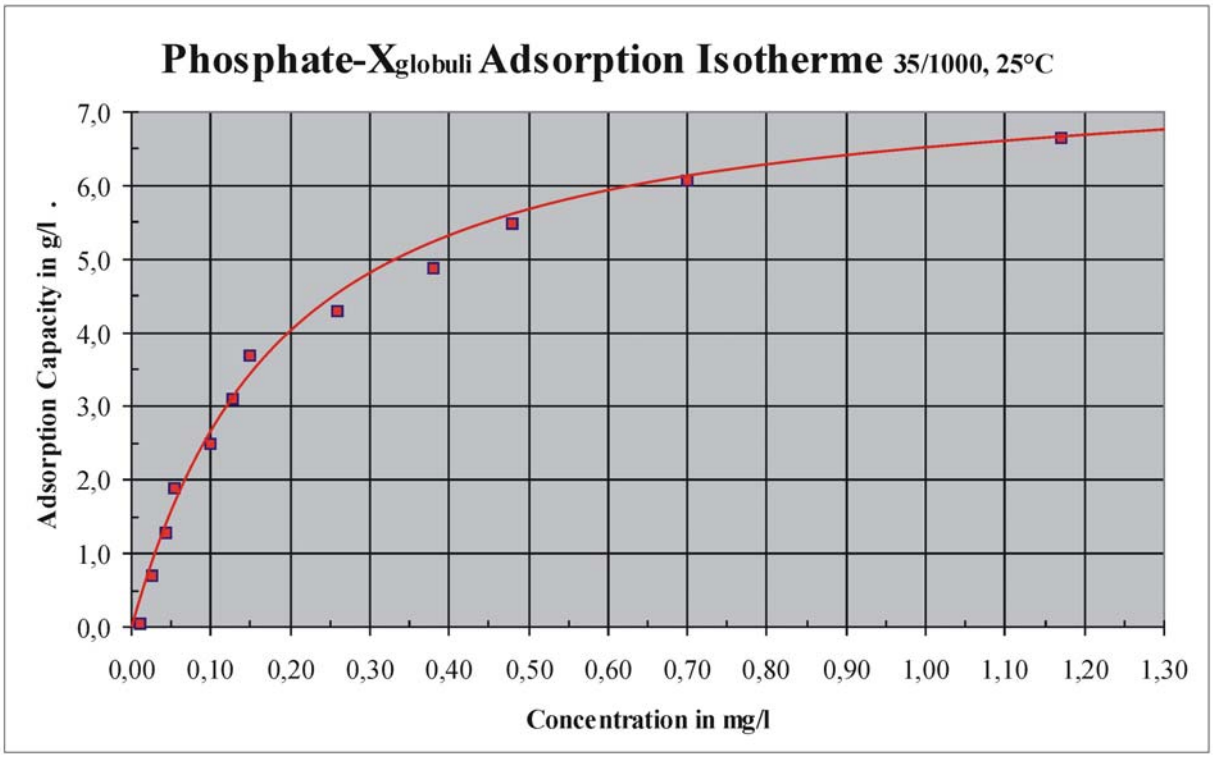


Phosphate is a very important nutrient and should never miss. But if the water contains too much phosphate green and cyano-bacteria (blue-green algae) are growing rapidly and hard corals will be destroyed. In the modern reef aquaristic the phosphate concentration should be between 0.05…0.20 mg/l (ppm). AquaCare Phosphate $X_{globuli}$ have following advantages:

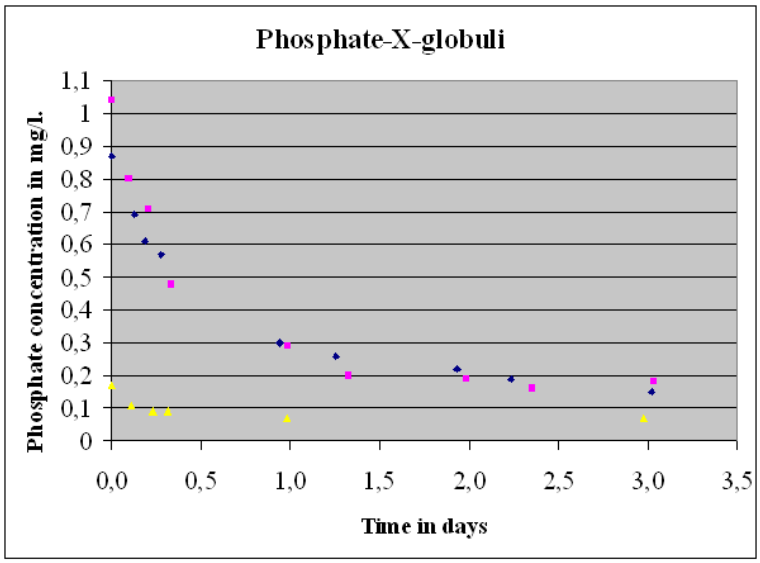
- high performance
- safe adsorption
- no dust
- regular size; perfect for moving bed technology
- no release of soluble iron
- no release of colour

Technical data

Matrix	Porous polystyrene, impregnated with iron hydroxide nano particles
Size of balls	0.4...1.2 mm diameter
Whole balls	minimum 95%
Bulk density	790...820 g/l
Temperature range	0...80°C
pH range	4.5...8.5
Salinity	0...40 ppt (suitable for fresh and sea water)
Packaging unit	1 litre: order number 578-010 28 liters: order number 578-280



The efficiency of an adsorber is shown in the adsorption isotherm. In the graphic above the maximum adsorption capacity is drawn against the wished maximum phosphate concentration. If you wish to have a maximum phosphate concentration of 0.5 mg/l (ppm) one litre AquaCare Phosphate $X_{globuli}$ in sea water at 25°C is able to adsorb 5 grams phosphate; is the maximum limit at 0.2 the capacity is about 4 grams.



Picture: typical decline of the phosphate concentration in a sea water aquarium with a high (blue, purple) and low (yellow) level of phosphate while using Phosphate-$X_{globuli}$. The loaded PMR filter was started at day 0. Within 3 days the high phosphate concentration drops below the harmful concentration of 0.2 ppm.

To prevent an increase of the phosphate concentration at low levels the service life will least several weeks depending on the size of the aquarium, the size of the PMR filter, and the input of phosphate (e.g. feeding). Not before the concentration reaches the upper limit the Phosphate-$X_{globuli}$ have to replaced.

The MF_2 as Activated Carbon Filter

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- removes oxidants such as chlorine and ozone
- removes coral toxins (poisons)
- removes yellow substances and medication residues
- as air pollutant filter before skimmers

AK50-40 AK100

With activated carbon, disturbing substances such as yellow substances (tannins), drug residues, nettle toxins, overdoses of iodine and other substances can be filtered out of the aquarium water. If an activated carbon filter is connected in front of the air inlet of a skimmer, air pollutants such as nicotine, ethereal oils and solvents can also be filtered out here so that they do not enter the aquarium water via the skimmer.

AquaCare's smallest filters consist of the universal MF_2 multifunctional filter. The larger filters consist of the PMMA empty filter (except AK75, AK250) and are thanks to the exchangeable filter screens similarly flexible. All filters are filled with AquaCare high-performance activated carbon in pellet form, which ensures a high throughput and low dust content.

Technical data of the Activated Carbon Filters AK50 - AK70:

Size	**AK 50**			**AK70**		
Order number	AK50-40	AK50-70	AK50-100	AK70-45	AK70-70	AK70-100
Diameter in mm	50					
Height in cm*	40	70	100	45	70	100
Necessary height in cm	+ 5 cm					
Usable volumen in litres	0.5	1.0	1.5	1.1	1.8	2.7
maximum aquarium size in litres	250	500	760	530	900	1300
as air filter in front of skimmer in liters.	1000	2000	3000	2100	3600	5400
maximum flow upstream in l/h	80			150		
maximum flow downstream in l/h	160			320		
Footprint width × depth in cm	14 × 10			18 × 14		
Total weight in kg	1.1	1.5	2.1	1.8	2.3	3.0
Erection	External, in the filter sump, with Hang-On holder to the aquarium or filter tank, with wall holders to a wall					
Materials	PMMA (Acrylic glass), NBR, silikone, PVC, PA					
Connectors**	G1/4" - 8 mm			20 mm PVC fittings, 12 mm hose nozzle		
Drain valve	Mounting possible					
Basic model	Multi Function Filter MF_2			PMMA empty filter		
Substrate: AquaCare pellet activated carbon	1 litre activated carbon, order number: 573-005; 50 litres activated carbon, order number: 573-250					

* special heights are possible ** others possible

Technical data of the Activated Carbon Filters AK100 - AK150:

Size	AK 100			AK150		
Order number	AK100-50 AK100-70 AK100-100			AK150-50 AK150-70 AK150-100		
Diameter in mm	100			150		
Height in cm*	50	70	100	50	70	100
Necessary height in cm	+ 5 cm					
Usable volumen in litres	2.5	3.8	5.8	5.5	8.7	13.4
maximum aquarium size in litres	1200	1900	2900	1600	4300	6700
as air filter in front of skimmer in m^3	5	7.6	11.5	11	17	27
maximum flow upstream in l/h	330			790		
maximum flow downstream in l/h	660			1580		
Footprint width × depth in cm	21 × 14			31 × 22		
Total weight in kg	2.8	3.7	5.0	6.5	8.3	11
Erection	External, in the filter sump, with Hang-On holder to the aquarium or filter tank, with wall holders to a wall					
Materials	PMMA (Acrylic glass), NBR, silicone, PVC, PA					
Connectors**	20 mm PVC fittings, 16 mm hose nozzles			25 mm PVC fittings		
Drain valve	G1/4"-6/4					
Basic model	PMMA-Leerfilter					
Substrate: AquaCare pellet activated carbon	1 litre activated carbon, order number: 573-005; 50 litres activated carbon, order number: 573-250					

* special heights are possible ** others possible

Technical data of the Activated Carbon Filters AK250 - AK300:

Size	AK 250	AK300		
Order number	375-025	AK300-50 AK300-100 AK300-150		
Diameter in mm	250	300		
Height in cm*	100	50	100	150
Necessary height in cm	+5 cm			
Usable volumen in litres	30	22	55	88
maximum aquarium size in m^3	18	11	27	44
as air filter in front of skimmer in m^3	60	44	110	176
maximum flow upstream in m^3/h	2.3	3.3		
maximum flow downstream in m^3/h	4.5	6.6		
Footprint width × depth in cm	43 × 37	50 × 38		
Total weight in kg	40	33	51	72
Erection	External, in the filter sump			
Materials	PVC (transparent), PVC, NBR, ABS	PMMA (Acrylic glass), NBR, silicone, PVC, PA		
Connectors**	32 mm PVC fittings	40 mm PVC fittings		
Drain valve	PVC20	1/2"-16		
Basic model	PVC empty filter	PMMA empty filter		
Substrate: AquaCare pellet activated carbon	50 litres activated carbon, order number: 573-250			

* special heights are possible ** others possible

Trickling Filter

based on

Multi-Function-Filter MF_2

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Multifunctional trickling filter

The MF_2 multifunction filter can also be used as a trickling filter. The scope of delivery consists of the original filter made of high-quality acrylic glass, 5 mm bottom sieve, stainless steel rod to pull out the bottom sieve, PE filling elements, lid with irrigation plate, aeration valve and 8 mm nozzle connections.

The MF_2 filters are available in different diameters and heights - special lengths are also possible.

And if you no longer need the MF_2 trickling filter, you can convert the filter for other applications with just a few accessories! The complete possibilities of the MF_2 filter can be found at aquacare-shop.de/MF2-EN

Technical data of the AquaCare MF_2 Trickling Filter:

Type	**TKF 50**		
Diameter in mm	50		
Maximum size of aquarium in litres, approx.	50	100	150
Flow in l/h*	80...170		
Lenghts in cm**	40	70	100
Neede height in cm	+5		
Effective volume in litres	0.5	1.0	1.5
Footprint size in cm	14 × 10		
Total weight of filter (dry)	0.8	1.0	1.2
Erection	externally, in the filter sump, with hang-on holder on the aquarium or filter basin, with wall brackets on a wall		
Materials	PMMA (Acrylic glass), NBR, silicone, PVC		
Connectors	8 mm		

* when using AquaCare-PE-fillings, black
** special heights up to max. 2.1 m are possible

Trickling Filter

TKF

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AquaCare TKF 150-100

The trickling filter system is one of the oldest filter technology. The water is flowing over trickling material and will be enriched with oxygen or too much carbon dioxide will be stripped. If the filter material is cleverly chosen it will not block and has a constant biological activity during operation. AquaCare uses a material made of PE with a high specific surface (500 m^2/m^3) and will not block under normal aquaristic conditions. The models can be additionally aerated to raise the biological activity. The AquaCare TKF is useable as an de-aeration stage after skimmers, too. The total height of the TKF must be a little bit lower than the outlet of the skimmer.

The advantages of the TKF:

- high hydraulic load
- the total surface will be settled by micro-organisms
- inactive bio-films are flushed out automatically
- constant biological activity
- simple handling
- for PVC tubing and hoses
- nearly free of maintenance

Technical data of the AquaCare TKF70 ... TKF100:

Size	**TKF 70**			**TKF100**		
Order number	TKF70-45	TKF70-70	TKF70-100	TKF100-50	TKF100-70	TKF100-100
max. aquarium size, approx.	100	120	270	245	380	580
max. water flow in l/h	150...300			330...660		
Diameter in mm	70			100		
Assembly	External or in the filter sump, hang-on, hang-in, with wall brackets					
Total height in cm*	45	70	100	50	70	100
Necessary space in cm	+ 5 cm					
Foot print size in mm	180 × 140			210 × 150		
Materials	PMMA, PVC, ABS, NBR o-rings					
Connectors	20 mm PVC-Fittings, 12 mm nozzle			20 mm PVC-Fittings, 16 mm nozzle		
Drain valve	no (can be retrofitted)			Valve for 6/4 hose		
Forced aeration possible	yes					
Total weight in kg	1,4	1,7	2,0	1,9	3,9	5,0
Substrate (filter material)	PE material d16×20mm, black					

* special heights are possible!

Technical data of the AquaCare TKF150 ... TKF250:

Size	TKF150			TKF250
Order number	TKF150-50	TKF150-70	TKF150-100	361-250
max. aquarium size, approx.	550	870	1300	3500
max. water flow in l/h	790...1600			2300...4500
Diameter in mm	150			250
Assembly	External, filter sump, hang-on, hang-in, with wall brackets			External or in the filter sump
Total height in cm*	50	70	100	185
Necessary space in cm	+ 5			
Foot print size in mm	190 × 140			430 × 370
Materials	PMMA, PVCu, NBR o-rings			
Connectors	25 mm PVC fittings, 25 mm nozzles			32 mm PVC fittings, 32 mm nozzles
Drain valve	valve for 6/4 hose			PVC d20
Forced aeration possible	ja			
Total weight in kg	3.9	4.3	4.7	70
Substrate (filter material)	PE material d16×20mm, black			

* special heights are possible!

Technical data of the AquaCare TKF300 ... TKF400:

Size	TKF300			TKF400		
Order number	TKF300-50	TKF300-100	TKF300-150	TKF400-50	TKF400-100	TKF400-150
max. aquarium size, approx.	2	5,5	8,8	3,5	9,5	15,5
max. water flow in l/h	3,3...6,6			6...12		
Diameter in mm	300			400		
Assembly	External or in the filter sump					
Total height in cm*	50	100	150	50	100	150
Necessary space in cm	+ 5					
Foot print size in mm	500 × 380					
Materials	PMMA, PVCu, silicone o-rings					
Connectors	40 mm PVC fittings			50 mm PVC fittings		
Drain valve	Valve for 16 mm hose					
Forced aeration possible	ja					
Total weight in kg	25	31	37			
Substrate (filter material)	PE material d16×20mm, black					

* special heights are possible!

SOON

For high efficiency systems e.g. aqua culture units, we can deliver TKF systems in technical size, too.

Zeolite Filter

Zeo

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- enables the zeolite process
- removes ammonia quickly and reliably
- produces bacterioplankton for corals and other filter feeders
- reduces nitrate and phosphate by assimilation
- binds heavy metals by means of ion exchange effect

Zeo100-50

The zeolite filter has **two modes of action**:
On the one hand, ammonium/**ammonia** and **organic substances** bind on the surface of the filter material (zeolite). These are consumed by bacteria so that a bacterial lawn is formed. To prevent the filter from becoming overgrown over time, the filter bed must be rinsed regularly. To do this, the filter bed is shaken up daily with the supply of air so that excess bacteria and mulm are rinsed off.
In aquariums with nutrient deficiencies, the excess bacteria should be fed into the aquarium as **bacterioplankton**.
In eutrophic (polluted) aquariums, the drain of the zeolite filter should end before the skimmer so that it skims the bacteria and thereby **removes nutrients** from the system. It is also possible to discharge it into a fleece filter.

On the other hand, the natural mineral zeolite **binds heavy metals** such as lead, zinc and others as an ion exchanger. It is important to replace 2/3 of the filter material approximately every two months.

The filters consist of the PMMA empty filter and are versatilely convertible for other tasks thanks to the exchangeable filter screens. - All filters are filled with AquaCare zeolite mineral, which ensures a high flow rate and can be flushed well.

Technical data of the AquaCare Zeolite Filters Zeo70 ... Zeo100:

Size	**Zeo 70**			**Zeo 100**		
Order number	ZEO50-40	ZEO50-70	ZEO50-100	ZEO100-45	ZEO100-70	ZEO100-100
Diameter in mm	70			100		
Total height in cm*	45	70	100	50	70	100
Necessyr height in cm	+ 5 cm					
Usable volume in liters	1.1	1.8	2.7	2.5	3.8	5.8
maximum aquarium size in liters, appr.	500	900	1300	1200	1900	2800
Upstream flow in l/h	250...500			500...1000		
Required minimum air flow in l/h	100			200		
Footpring Width × depth in cm	18 × 14			21 × 14		
Total weight in kg	2.2	3.1	4.1	4.4	5.8	7.9
Erection	Externally, in the filter sump, with hang-on bracket to the aquarium or filter basin, with wall brackets to a wall					
Materials	PMMA (acrylic glass), NBR, silicone, PVC, PA					
Connections **	20 mm PVC fittings, 16 mm hose nozzle					
Connection air input	4 mm hose nozzel (for standard air hose)					
Basi model	PMMA empty filter					
Substrate: AquaCare Zeolite mineral, graining: 8-16 mm	1 Liter Zeolite (approx. 0.9 kg), order number: 593-001; 25 kg Zeolite (approx. 22.5 Liter)), order number: 596-025					
Suitabel water pump	aquabee UP1000			aquabee UP2000		
Suitable air pump	Schego optimal			Schego M2K3		

* Special heights are possible! ** others possible

Empty filter
based on the MultiFunctionFilter MF_2

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The MF_2-50 MultiFunctionFilter

The MF_2 multifunctional filter can also be used as an empty filter for any filter material. The scope of delivery consists of the actual filter made of high-quality acrylic glass, matching connections and accessories for the operating modes: upstream, downstream, fluid bed and circulation filter.

The MF_2 filters are available in different diameters - special lengths are also possible.

And if you no longer need the MF_2 fluidized bed filter, you can convert the filter for other applications with just a few additional parts! The complete possibilities of the MF_2 filter can be found at http://aquacare-shop.de/MF2-EN

Technical data of the MF_2 Filter:

Type	**MF_2 50**	**MF_2 70**
Order number	MF2-050-x	MF2-070-x
Diameter in mm	50	70
maximum flow in l/h*	90	180
Height in cm**	40 (70; 100)	45 (70; 100)
Necessary height in cm	+5	
Usable volume in litres	0.5 (1.0; 1.5)	1.2 (2.0; 3.1)
Footprint width × depth in cm	14 × 10	16 × 12
Empty weight in kg	0,7	
Erectoin	External, in the filter sump, with Hang-On bracket to the aquarium or filter basin, with wall brackets to a wall	
Temperature range	-2...80°C	
Materials	PMMA (acrylic glass), NBR, silikone, PVC	
Connectors	8 mm	10 mm
Drain valve	can be installed: G1/4" female thread	

soon

* extremely dependent on the filter material used
** special heights are possible

Empty filter for different filter materials

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PMMA d100 in different heights and PMMA150

Empty filters are an important component for creating an individual filter system. AquaCare offers a range of empty filters suitable for a wide variety of substrates. Special heights can be manufactured by AquaCare at any time.

The advantages of the AquaCare empty filters:

- screens at the bottom and at the top
- different screens are possible
- upflow, downflow, moving bed and trickling filter are possible
- rigid construction
- auxiliary connections are possible
- probe connectors are possible

Technical data of the AquaCare empty filters: d70 ... d100

Size	**Filter 70**	**Filter 100**
Order number	PMMA-70-45 PMMA-70-70 PMMA-70-100	PMMA-100-50 PMMA-100-70 PMMA-100-100
Flow in l/h*	300	700
Diameter in mm	75	100
Useful volume in litre	1.1 1.8 2.7	2.5 3.8 5.8
Placement	External, in the filter sump, hang-on or wall brackets	
Total height in cm** (without venting valve)	45 70 100	50 70 100
Necessary height in cm**	+ 5 cm	
Foot print size wide × depths in mm	180 × 140	210 × 160
Size of screen	option: 15, 8, 4, 2 mm or 200, 150, 100, 50, 25, 15, 6 µm oder moving bed screen FBF, ozone reacktor screen OZR	
Materials	PMMA, PVC, ABS, PA, silicone, NBR	
Connectors	d20 or nozzle 12	d20 or nozzle 16
Drain	Non (can be retrofitted)	valve 6/4
Total weight in kg	1,2 1,5 1,7	1.7 1.9 2.3
Possible substrates	all granular materials are possible	

* depending on filter material and screen, ** special heights are possible

Technical data of the AquaCare empty filters: d150 ... d300

Size	Filter 150	Filter 250	Filter 300
Order number	PMMA150-50 PMMA150-70 PMMA150-100	370-250	PMMA300-50 PMMA300-100 PMMA300-150
Flow in l/h*	1600	4500	6600
Diameter in mm	150	250	300
Useful volume in litre	5.5 8.7 13.4	40	22 l 55 l 88 l
Max. operation pressure (at upper edge of filter)	0,1 bar (1 m WS)		
Placement	External or in the filter sump (Hang-On and wall bracket only for filter 150)		
Total height in cm** (without venting valve)	50 70 100	100	50 100 150
Necessary height in cm**	+ 5 cm		
Foot print size wide × depths in mm	310 × 220	370 × 300	500 × 380
Size of screen	selectable: 15, 8, 4, 2 mm or 200, 150, 100, 50, 25, 15, 6 µm or moving bed screen		
Materials	PVC/PMMA, silikone, NBR		
Connectors (PVC unions)	d25	d32	d40
Drain	valve 6/4	valve d20	valve 16
Total weight in kg	3.9 4.2 4.7	20	13 16 19
Possible substrates	all granular materials are possible		

* depending on filter material and screen, ** special heights are possible

For larger systems AquaCare manufactures filters with diameter up to 2400 mm.

Smart Filter

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AquaCare small filter for filling with different materials

The smart filter is completely demountable

Small filters are needed for the smallest aquariums (nano aquariums). But small filters can also serve well for special applications for large aquariums; e.g. small gas filters in the intake flow before skimmers, which remove the CO_2 in the air and thus raise the pH value in the aquarium.

The Smart-Filter series is pressure-resistant and can therefore also be used for special filters in reverse osmosis systems.

The small filters (KLFI) with a diameter of 32 mm can be used as particle filters, drop counters or bubble counters. Small particle filters are particularly practical when mounted in front of adjustment valves for bypass systems (lime reactors, nitrate filters). At very low flow rates, adjustment valves quickly become clogged, so that the set water volume continuously decreases. The small filter prevents clogging of the valve for several weeks to months.

Size	**Smart Filter 200**	**d32 Small Filter**
Order number	Smart-200	KLFI-xxx
Volumen	190 ml	70 ml
Connectors	G1/4" female thread	
Materials	SAN, PP, silicone	PVC, PA, PE
Outer diameter	d50	d32
Totale lenght (without fitting)	260 mm	140 mm
Maximum pressure	6 bar	

Ready made small filters	Order number
Activated carbon filter: max. 100 liters aquariums; as skimmer air pre-filter max. 400 liters aquariums.	Smart-200-AK
CO_2 adsorber: max. 100 liters aquariums	Smart-200-CO2
Air dryer modules: max. 280 liter, max. 11 mg/h ozone output	Smart-200-LTM
Mixed bed resin filter for reverse osmosis systems: max. 0.2 l/h	Smart-200-MB
Nitrate resin filter only for freshwater: max. 100 liters aquariums	Smart-200-NO3
Phosphate filter: max. 100 liters aquariums	Smart-200-PO4
Particle filter with 4 mm nozzles	KLFI-001
Particle filter with 6 mm push fitting	KLFI-002
Particle filter with 10 mm push fitting	KLFI-004
Particle filter with 6 mm valve (push-fit)	KLFI-003
Small filter as silencer PA nozzle	KLFI-005
Small filter with 1 liter volume, diameter d75 mm, fittings as desired	KLFI-044

The Smart Filter series is supplied complete with two holders and fixing screws. For the KLFI small filter there are 32 mm wall brackets and special brackets for direct attachment to other pipes.

Accessories		Order number
Holder for Smart-Filter-200		UV-6a
d32 mm wall bracket from PE		770-032
Double pipe clamp for small filter	 	Filterclip-40 Filterclip-50 Filterclip-63 Filterclip-70 Filterclip-100 Filterclip-110 Filterclip-150

Calcium and Alkalinity

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Turbo Chalk Reactor size 1 made of acrylic glass

Turbo Chalk Reactor size 5 made of PVC

Where are calcium and carbonate hardness consumed?

In freshwater aquariums, both calcium (total hardness) and carbonate hardness (alkalinity) are consumed to only a small extent. To adjust these values, it is sufficient to supply the water with care products or a mineral filter.

A large number of animals and algae live in the marine aquarium and require large amounts of calcium and carbonate hardness for their skeletons. These two substances are taken from the seawater. Therefore, calcium and carbonate hardness must be regularly added to the seawater aquarium.

Four successful methods are currently known:

1. Calcium chloride & sodium hydrogen carbonate method according to BALLING (see care products)

2. Lime water according to WILKENS (see calcium hydroxide and KWR)

3. Lime reactor (*Turbo* chalk reactor)

4. Carbon dioxide injection (see night shut-off and COR carbon dioxide reactor): this method can only be used for very special coral breeding systems. For the "normal" coral reef aquarium this system is not recommended.

Note that calcium can only be enriched in the marine aquarium if sufficient magnesium is present.

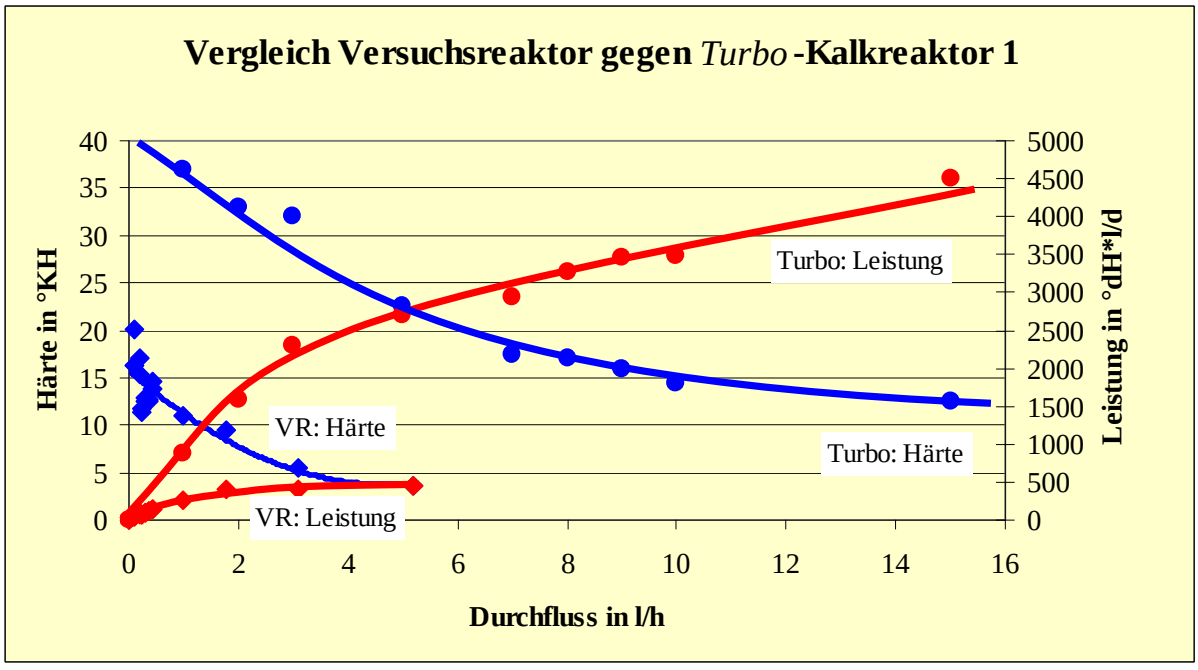
The *Turbo*-Chalk Reactor

Hard corals require a large amount of dissolved lime. Foto: Hoebink

The *Turbo* Chalk Reactor is a **consistent advancement** of conventional lime reactors. The carbon dioxide supply is visible through an **integrated bubble counter** and fills the **CO_2 column**. The resulting extremely low pH value of 5.0-5.3 allows the calcium carbonate dissolving power to reach new dimensions. Due to the extreme flow, neither channels form in the granulate tube nor sediment is deposited, which could hinder the process. The water enriched with dissolved lime is then stripped of excess CO_2 in the **neutralization stage**, so that the pH value of the outlet water is 7.0 to 7.3. This means approx. 80% less input of free carbon dioxide into the aquarium. Too small lime particles (sediment) settle in the downstream **lamella separator**. This sediment stage can be easily separated from the system and cleaned.

The ***Turbo* control** (option) of the CO_2 is carried out without pH measuring chain: this means less maintenance and costs with higher safety at the same time. With the control no carbon dioxide overdosing is possible. At the same time, **the maximum achievable output is set automatically** - regardless of lime material and its filling level. The water inflow can be easily controlled through a **sight glass** and measured by means of a flow meter (option). In the case of small *Turbo* Chalk Reactors, the water feed can also be provided by a robust dosing pump.

Dependence of hardness and performance on flow rate.

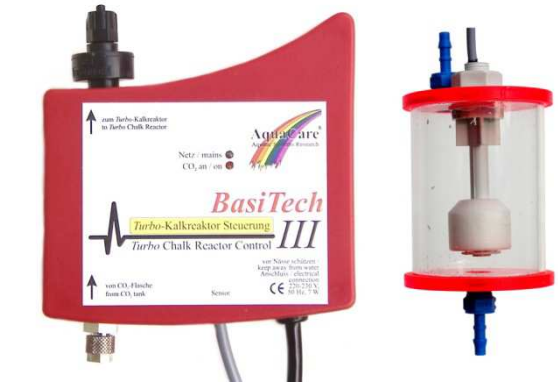


During a research project sponsored by the AiF, the *Turbo* Chalk Reactor size 1 (PVC version with 0.24 liters of *Turbo* granules) was compared with a conventional test reactor (VR) with 2.77 liters of *Turbo* granules. Despite a 12-fold increase in reaction volume, the experimental reactor did not come close to matching the performance of the *Turbo* Chalk Reactor.

Technical Data of the *Turbo* Chalk Reactor

Size **Order number**	**Size 1** Turbo1	**Size 2** 310-002	**Size 3** 310-003	**Size 4** 310-004	**Size 5** 310-005
maximum aquarium size in liters	500	1.000	2.500	7.000	10.000
dimensions (W×H×D) in cm	41×41×11,5	30,5×57×13	40×57×17	49×110×22	49×140×22
required height in cm	+2 cm	-	-	-	-
diameter of calcite tube in mm	40	50	63	110	110
volumen of granulate in liters	0.30	0.42	0.93	4.0	6.3
pH value of outlet	7,0...7,3				
maximum / average daily output in hardness liters at 3h/d operation	2,000 / 250	4,000 / 500	10,000 / 1,250	20,000 / 2,500	40,000 / 5,000
built-in pump	UP 300	UP 1000	UP 2000	UP 2000/1	UP 2000/1
electrical power in watts	4	10	18	38	38
inlet / outlet connections	PA nozzles 4+10	6 and 10 mm AquaCare push-fit fittings			
optimum inflow in l/h	4 - 5	8 - 10	20 - 25	40 - 50	80 - 100
flow meter in l/h (option)	-	3-24	5-50	15-150	15-150 included in the scope of delivery
required air flow in l/h	200	300	400	400	500
required carbon dioxide supply	Carbon dioxide pressure bottle with pressure relief valve and needle valve, a good check valve for CO_2				
wall mounting	yes				
stand mounting / Hang-On (option)	yes	no			
material	PMMA	PVC			

BasiTech Chalk Reactor Control



The *Turbo* Chalk Reactor Control with CO_2 sensor

The *Turbo* Chalk Reactor Control of the BasiTech series considerably simplifies the operation of the *Turbo* Chalk Reactor. The circuit is strongly recommended for size 4 and larger.

The control consists of a robust designer housing and contains the circuit board, a solenoid valve, check valve and connections for 6/4mm PE hoses. Also included is the CO_2 sensor, which fits any *Turbo* Chalk Reactor size and can be easily retrofitted.

Pure hard coral aquariums are not stable for long without the regular addition of dissolved lime. Foto: Hoebink

Magnesium

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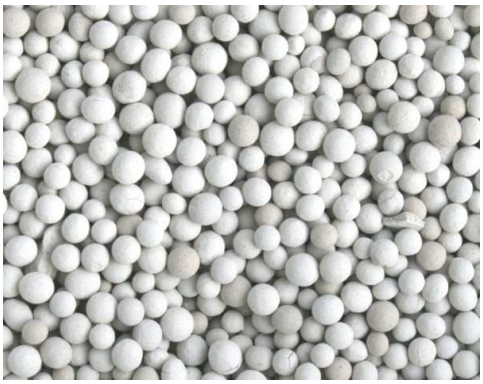
Problem of magnesium supply

Magnesium is not only increasingly absorbed by some organisms (e. g. red calcareous algae, gorgonia); it also plays an important role in the lime balance. If the magnesium concentration in seawater falls clearly below 1300 mg/l, it can easily happen that calcium precipitates as calcium carbonate and is no longer available dissolved in the water. Calcium concentration and carbonate hardness are falling rapidly; often so quickly that the lime reactor is no longer able to dissolve new calcium and carbonate hardness (alkalinity) in seawater. Magnesium therefore plays an important role as a precipitation inhibitor in the water chemistry of the marine aquarium. Only when there is enough magnesium as ion in the water - optimum at 1350 mg/l - can calcium be dissolved in the water at the optimum concentration (approx. 400 mg/l).



Turbo-Magnesium

Like the calcium *Turbo* granules, the *Turbo*-Magnesium granulate is a highly soluble product. Solubility is many times higher than that of conventional materials such as dolomite rock. This means that under aquarium conditions more magnesium is dissolved at the same time. The magnesium concentration in the aquarium should be checked every month. As a rough guideline, 1 litre of magnesium granulate should be used per 1000 litres of aquarium volume. Depending on the aquarium, however, this amount can be too much or too less. The individual quantity can only be determined by experiments. Over the years, the quantity determined may also change. Therefore, regular monitoring of the magnesium concentration is important. Water that flows through the *Turbo*-Magnesium granulate has a higher pH value. At pH-values of more than 8.3 in the aquarium water, the pH-value should be checked regularly and if necessary the *Turbo*-magnesium granulate should be removed.

Technical Data	
Magnesium oxide	70-75%
Calcium oxide	4-5%
Iron oxide, aluminium oxide, silica oxide	3-4%
Annealing loss	16-20%
Size of granules	2-5 mm
Form	predominantly round
Bulk density	ca. 1300 g/l
Order number 2,5 kg	561-003
Order number 15 kg	561-015

Detail of an AquaCare aquarium

Magnesium Tube

Magnesium Tube as sump version (left) and for wall mounting (right)

Application

Turbo-magnesium should not be mixed with calcium material in the calcium reactor. The granules have different dissolving characteristics and magnesium can quickly accumulate too much. The aquarist is unable to control the performance of the two granules in a mixing system. It is better to install an additional column behind the lime reactor (traditional system or *Turbo* chalk reactor) and fill it with *Turbo*-magnesium. Once the optimum magnesium concentration in the aquarium water has been achieved, the column can be easily removed and the lime reactor continues to work on its own. The power of the downstream magnesium column can be roughly regulated with the filling quantity. The more granules used, the higher the performance. It should be noted that fresh *Turbo*-magnesium granules have a higher performance than those already in use. The *Turbo*-magnesium may only be filled directly into the calcium reactor if the magnesium requirement is very high.

Special design: the Magnesium Tube (left tube) is mounted directly onto the mounting plate of the *Turbo* Chalk Reactor (not size 1)

Technical Data

for *Turbo* size (Filter sump version)	diameter	length	order number
Turbo 1+2	50 mm	400 mm	312-105
Turbo 3	63 mm	430 mm	312-111
Turbo 4+5	110 mm	700 mm	312-110
for *Turbo* size (wall mounting)	diameter	length	order number
Turbo 1+2	50 mm	400 mm	312-106
Turbo 3	63 mm	430 mm	312-009
Turbo 4	110 mm	700 mm	312-008
Turbo 5	110 mm	1000 mm	312-007
connectors	10 mm push fit fittings		
materials	PVC, PP, POM		

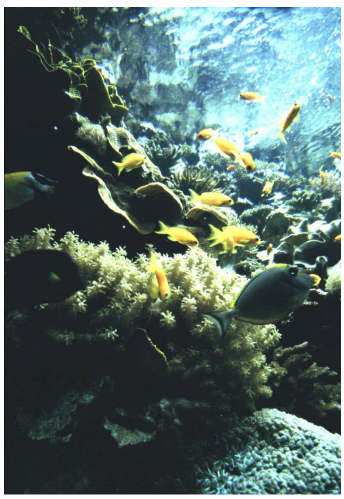
Special length are possible

Magnesium-plus

Very small aquariums, to which neither lime nor magnesium reactors are connected, can be easily supplied with the AquaCare liquid product Magnesium-plus with missing magnesium.

Order numbers

500 ml	517-002
1000 ml	517-010
5000 ml	517-050
5000 ml concentrate	517-250



Detail of an AquaCare aquarium

The AquaCare Magnesium Reactor MgR is available for the very large demand.

Magnesium Reactor

MgR

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Magnesium Reactor MgR 110

To supply an aquarium with magnesium there a some ways: if an tank needs only small amount of magnesium it is possible to supply "Magnesium-plus". With slightly higher needs a Magnesium Tube connected after an chalk reactor is the right choice. But if the aquarium needs a lot of magnesium only a Magnesium Reactor can manage the problem.

In some aquaria you need high amounts of magnesium, e.g. *Gorgonia* need more magnesium than hard corals. Coralline algae need more magnesium, too.

The Mg-Reactor is filled with the proven *Turbo*-Magnesium Granules. It has a very high solubility. With the help of carbon dioxide (you need an CO_2 pressure tank, a pressure relief valve and a CO_2 check valve) the internal water of the reactor gets acidly and dissolves the granules: magnesium ions and carbonate hardness arise. A powerful circulation pump prevent the filter bed for blocking.

The advantages in a glance:

- very powerful
- no blocking
- CO_2 is circulated
- you do not need a CO_2 bubble counter
- automatically de-aeration of the pump
- connector for an ORP probe in series
- big volume
- easy maintenance
- may be used a traditional chalk reactor, too

Technical data of MgR Magnesium Reactors:

Size	MgR 75	MgR 110-040
Order number	372-008	372-011
max. aquarium volume in l (ca.)	400	1000
Water flow in l/h	0,5...2	1...5
Diameter in mm	75	110
Array	external or in a filter sump	
Total height in cm*	36	36
Required height in cm*	38	38
Footprint size wide × depth in mm	190 × 140	200 × 160
Build-in pump	UP1000	UP2000
Electrical consumption in W	10	18
Materials	PVC-U, ABS, NBR, PA	
Connectors	6 mm tube nozzles	
Drain	nein	EHEIM valve 12/16
Volume in l	0,8	1,8
Weight of substrate in kg	1,0	2,3
Total weight in kg	3,0	5,5
Substrate	*Turbo* Magnesium Granules	
2,5 kg *Turbo* Magnesium Granules, grain size 4-5 mm, order number: 561-003 15 kg *Turbo* Magnesium Granules, grain size 4-5 mm, order number: 561-015		

* other height are possible!

For high efficient systems of very big aquaria we can offer technical sizes of Magnesium Reactors MgR, too

CO_2-Reactor COR

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Why CO_2?

In sea water the CO_2 Reactor can be used for the injection method for CO_2. This method is practicable however only in nitrogen and phosphate-limited tanks (both substances should be at the detection limit). In hard coral breeding tanks the growth can be offered with this method easily by offering inorganic carbon (CO_2 – hydrogen carbonate - carbonate) to the hard corals. In aquariums, that are fed very well and therefore phosphate and nitrate are well present, this method should not be used in any case. Otherwise algae will grow very fast and may damage the corals. We advise urgently to use the CO_2 Reactor within the sea water range only with pH value control (pH measuring and controller, solenoid valve).

In fresh water (amazon type) one of the main conditions is the supply of CO_2 for healthy and strong plant structure. How much CO_2 one aquarium needs depends on several factors:

1. Carbonate hardness of the aquarium water; 2. Volume of the aquarium; 3. Species and quantity of the plants; 4. daily lightning time and strength of the lights. The lower carbonate hardness the less CO_2 is needed on the one hand to press down the pH value under 7.0 and on the other hand to nourish the plants. Is any carbonate hardness available (0°dKH) - e.g. water from a good reverse osmosis plant - additional carbon dioxide dosage is not necessary. To operate an aquarium without carbonate hardness it will work however only, if very many plants are in the tank and only very few fish with a corresponding food needs are nursed. If too much is fed a pH fall may happen, which may end for fish and plants deadly. If many fish are kept in the aquarium the carbonate hardness should be 3-4 °dKH. The carbonate hardness can be supplied to the water automatically with KH plus, Triple Buffer, Mineral Salt or can be produced with a Mineral Filter directly behind the reverse osmosis plant. The necessary carbon dioxide quantity for the right pH value can be easily supplied with the CO_2 Reactor. If hard to very hard water is in the aquarium, the CO_2 Reactor must be number larger, in order to regulate the pH value deeply enough.

Description of the AquaCare COR

The AquaCare CO_2 Reactor consists of PVC and can be fastened with two wall clips. The pressure side of an external filter or a pump leads to the upper connection of the reactor - the lower connection leads back again into the aquarium. With very strong pumps the reactor should be operated in the bypass. The CO_2 bubbles from the bottom into the reactor - an extra bubble counter is not necessary, if the equipment is well visibly attached. The higher the number of CO_2 bubbles, the more the water is acidified. The ideal pH value is in a plant aquarium (amazon type) between 6,5 and 7,0. The dosage of the carbon dioxide can be done automatically with a pH value controller and an attached solenoid valve. Like that an overdosing is impossible. Alternatively the night shut off equipment can be used, which is operated with the help of a timer and a solenoid valve. However a check valve made for CO_2 must be used to prevent the CO_2 tank for damages.

Tip! If you use an CO_2 Reactor the pH value should be measured and controlled. Otherwise a pH value drop may occur.

Technical Data of the AquaCare CO_2 reactor:

Type	COR50	COR75	COR110	COR160	COR250
Order number	330-005	330-075	330-110	330-160	330-250
max. aquarium size, litres	1.000	5.000	20.000	100.000	500.000
max. water flow in l/h	400	800	2,000	4,500	11,000
Diameter reaction tube, mm	50	75	110	160	250
Volume tube, litres	0,5	1,7	4,7	14	44
height, mm	300	400	500	700	900
nozzle or PVC union please decide if you order	12 / d16	16 / d20	25 / d32	- / d40	- / d50
Night shut off control	solenoid 230 V AC with plug and timer: 321-003				
Check valve for CO_2	321-002				

Night Shut Down

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The problem

If a conventional chalk reactor, the AquaCare magnesium reactor or the AquaCare carbon dioxide reactor COR (CO_2 fertilizing unit) should not run all the day you can use a night shutt-off. Especially at night the animals (corals) and plants / algae do not need carbon dioxide. So at this time span you do not need a CO_2 supply. Many pH-controller are not able to stop the carbon dioxide feed, too. The AquaCare night shut-off can solve this problem.

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Functionality

The night shut-off consists of a timer and a rigid solenoid valve, that is suitable for CO_2 very well. The solenoid of the unit should be mounted between carbon dioxide pressure tank and the CO_2 check valve. The mains cable must be connected with the timer. If you use a compacts pH-controller the solenoid should be connected between controller and carbon dioxide pressure tank. You can program the timer in that way that the solenoid shut on only at night. With this operation mode you can safe a lot of carbon dioxide.

Technical Data

order number	321-003
scope of delivery	timer, solenoid with plug and connectors
adjustable time interval	15 min
Time control	mechanically
electrical connection of solenoid	230 V, 50-60 Hz, 4 W, three-pin plug
duty cycle	100%
length of cable	1.5 meter
fittings	6 mm for pressure tube

BasiTech Turbo-Chalk Reactor Control

Structure of the *Turbo*-Chalk Reactor Control

This control is made for the AquaCare *Turbo* Chalk Reactor only and consists of a shapely casing with built-in micro controller, solenoid valve and CO_2 check valve. The CO_2 sensor that can be connected to every AquaCare Turbo Chalk Reactor is connected with a plug to the circuit.

Functionality

If CO_2 lack occurs at the *Turbo* Chalk Reactor the circuit shut on the CO_2 solenoid with a time delay of 3 seconds. If the optimum CO_2 volume is obtained the solenoid shuts off. The electrical supply of the control should be connected to the same timer that provides the circulation pump of the *Turbo* Chalk Reactor.
The AquaCare *Turbo* Chalk Reactor is very efficient. So it should run only about 1 to 12 hours daily.

Technische Daten

order number	600-001
dimensions L×W×D of box	160 × 90 × 45 mm
scope of delivery	box with solenoid, check valve and CO_2 sensor
time delay	3 seconds
electrical connection	230 V, 50/60 Hz, 7 W
length of cable	2 m
material of box	ABS
mass	800 g

Lime Water Reactor KWR

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AquaCare „Kalkwasser“ Reactor and ultra pure Calcium Hydroxide

The AquaCare **Lime Water „Kalkwasser“ reactor KWR** ensures a simple and safe supply of calcium for sea water aquaria. The pH of the aquarium water will be increased a little bit and hinders a too much CO_2 concentration in the water. Additionally phosphate will be precipitated continuously. The AquaCare **Lime Water Reactor KWR** has following advantages:

- Intensive mixing of the calcium hydroxide with a rigid pump – low running costs
- free water outlet ensures a safe running – check or ball valves will be build in the inlet of the system and will not be crusted with chalk
- continuously or discontinuously running possible
- easy de-aeration
- size for all aquaria
- ideal in combination with automatic level control *BasiTech*
- pH control possible – therefore the quality of the „Kalkwasser“ will be monitored

With the combination of a Chalk Reactor (disadvantage: CO_2 supply into the aquarium water) and a “Kalkwasser” Mixer (disadvantage: any carbonate hardness will be produced) a very safe supply of calcium and hydrogen carbonate is established. Please take care that the magnesium concentration in the right concentration, too.

A perfect “Kalkwasser” dosing can be realized with a AquaCare “Kalkwasser” Reactor in combination with a *BasisTec* Level Control and an AquaCare Dosing Pump. If the water level in the aquarium or in the filter sump caused by evaporation will fall the level control will start the dosing pump. The R.O. water is running through the “Kalkwasser” Reactor and drops into the water. There the “Kalkwasser” eliminates the too much carbon dioxide (e.g. from a chalk reactor), precipitated phosphate and enriches the water with calcium. If the right water level is reached, the *BasiTec* Level Control stops the dosing pump.
If you combine the level control with a timer you can operate the “Kalkwasser” Reactor during the night to prevent the pH drop, caused by missing photosynthesis.

Warning: Calcium hydroxide solution ("lime water") is highly corrosive. Keep calcium hydroxide powder and lime water reactor away from children. If the chemical comes into contact with skin or mucous membranes, rinse with plenty of water and seek medical advice (take the label of the calcium hydroxide with you!).

Detail of an AquaCare aquarium

Technical data of the AquaCare Kalkwasser Reactors KWR70-100:

Size	KWR70			KWR100		
Order number	KWR70-45	KWR70-70	KWR70-100	KWR100-50	KWR100-70	KWR100-100
Maximum aquarium size* in l	300	600	900	800	1200	1900
Diameter in mm	70			100		
Volume in litres, approx.	1,1	1,8	2,7	2.5	3.8	5.8
Maximum continuous flow in l/h	0,05	0,08	0,14	0.1	0.2	0.3
Maximum Kalkwasser production at dis-continuous operation in l	0,15	0,3	0,4	0.4	0.6	0.9
Total height in cm	45	70	100	50	70	100
Necessary height	+5 cm					
Foot print in cm	16 × 16			22 × 19		
Erection	External, in the filter sump, with Hang-On holder to the aquarium or filter tank, with wall holders to a wall					
Materials	PMMA, PVC, NBR, silicone, PA					
Connetor inlet	6/4 mm hose					
Connector outlet	1/4" - 10 mm nozzle					
Connector drain	G1/4" valve for 6/4er hose					
Built-in circulation pump	EHEIM 1046 (5 W)			EHEIM 1048 (10 W)		
Maximum calcium hydroxide filling in g	90	180	270	250	380	580
Delivered calcium hydroxide in g	500					
Calcium concentration in outlet	at 15°C: 720 mg/l; at 20°C: 690 mg/l; at 25°C: 670 mg/l					
Quantity of lime water per filling at 25°C in l	70	150	220	200	300	470
pH value in outlet	at 15°C: 12.8; at 20°C: 12.6: at 25°C: 12.5					
Necessary feed	Centrifugal pump with ball valve throttled or dosing pump or magnetic valve					
pH probe	can be retrofitted at any time					
Operation weight in kg	3.0	3.5	4.0	5.1	6.5	8.5

Technical data of the AquaCare Kalkwasser Reactors KWR150-250:

Size	KWR150			KWR250
Order number	KWR150-50	KWR150-70	KWR150-100	340-025
Maximum aquarium size* in l	1800	2900	4400	7000
Diameter in mm	150			250
Volume in litres, approx.	5.5	8.7	13.4	22
Maximum continuous flow in l/h	0.3	0.4	0.7	1.1
Maximum Kalkwasser production at dis-continuous operation in l	0.9	1.4	2.2	3.6
Total height in cm	50	70	100	70**
Necessary height	+5 cm			
Foot print in cm	31 × 26			43 × 37
Erection	external or in the filter sump			
Materials	PMMA, PVC, NBR, silicone, PA			PVC hart, NBR, PA
Connetor inlet	6/4 mm hose			
Connector outlet	1/2" - 12 mm nozzle			PVC d20
Connector drain	G1/4" valve for 6/4er hose			PVC d20
Built-in circulation pump	EHEIM 1248 (10 W)			EHEIM 1250 (28 W)
Maximum calcium hydroxide filling in g	550	870	1300	2200
Delivered calcium hydroxide in g	1000		1500	2500
Calcium concentration in outlet	at 15°C: 720 mg/l; at 20°C: 690 mg/l; at 25°C: 670 mg/l			
Quantity of lime water per filling at 25°C in l:	820	1300	1900	3300
pH value in outlet	at 15°C: 12.8; at 20°C: 12.6: at 25°C: 12.5			
Necessary feed	Centrifugal pump with ball valve throttled or dosing pump or magnetic valve			
pH probe	can be retrofitted at any time			on request
Operation weight in kg	13	17	21	49

* the aquarium size is calculated by evaporation of 1 litre per 100 litre aquarium volume and a life time of the calcium hydroxide of 6 weeks. It is possible to use smaller types for big aquaria, but you have refill the reactor more often. Oversized reactors are suitable for small aquaria and extend the life time of the filling.

Our care program

Additives for the aquarium

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Need for additives:
An aquarium constantly produces and uses inorganic substances (minerals and trace elements) and organic substances. Waste materials are transformed and removed by the filter system (LSS). Minerals and organic additives such as vitamins and amino acids must be added regularly to the aquarium.

The AquaCare system:
For automatic dosing and for small aquariums with low requirements, AquaCare offers liquid products that can be easily added to the aquarium manually or with dosing pumps. Concentrates and the "Super" series are available for the large demand.

Quality Made in Germany**:**
The AquaCare care line is characterised by the use of pure raw materials (quality: purest, PharEu or food quality), sophisticated recipes and simple application. The plastic bottles are made of reusable PET or polyethylene. We deliberately refrained from adding additional repackaging in order to reduce the amount of waste.

Our **mineral calculator** is available for a simple calculation of the needed quantities:
http://aquacare.de/index.php/en/aquaristic/aquaristic-info/waterparameter/mineral-calculator.html

Carbonate hardness / alkalinity / buffer capacity

The "carbonate hardness" is the most important buffer system in the aquarium. If there is sufficient "carbonate hardness" (alkalinity/acidity capacity), additions of acid or caustic solution change the pH value of the aquarium water only insignificantly - the pH value remains approximately constant. Acid is produced during nitrification, for example. If the acid production of the nitrifying bacteria is not buffered, the pH value can quickly drop into an unfavourable or even life-threatening area for plants and animals. The products KH-plus and Super-Puffer reliably increase the carbonate hardness and stabilize the pH value in freshwater and seawater aquariums.

Liquid product: KH-plus	**Powder: Super-Buffer**
250 ml for approx. 750 hardening litres order number: 501-002	**1000 g** order number: 572-010
1000 ml for approx. 3000 hardening litres order number: 501-010	**20 kg** order number: 572-200
5 litres for approx. 15000 hardening litres order number: 501-050	Dosing: approx. 1-10 g per 100 l and week
Dosing: approx. 10-100 ml per 100 l and week	

For very large aquariums or heavy coral growth we recommend the ***Turbo* Chalk Reactor**.

Calcium / magnesium / total hardness

The total hardness is a parameter for the concentration of alkaline earth metals. These metals - especially calcium and magnesium - are essential minerals and must therefore always be present in sufficient quantities in the aquarium water. In freshwater aquariums, however, the consumption of calcium and magnesium is so low that only when changing the water should the refill water be enriched with total hardness. Especially when using reverse osmosis water, these vital minerals should be supplied. The AquaCare mineral salt can be used as an alternative to these two solutions.
Depending on the number and activity of calcifying organisms, more or less calcium is consumed in the seawater aquarium. Calcium concentration of approx. 400-450 mg/l (ppm) in the aquarium water is optimal; magnesium should be approx. 1300 mg/l (ppm). Please check the concentration of calcium and magnesium regularly.
For large seawater aquariums or pure hard coral tanks, however, the best alternative is a lime reactor.

Liquid product: Calcium-plus

250 ml for approx. 750 hardening litres
order number: 502-002
1000 ml for approx. 3000 hardening litres
order number: 502-010
5 litres for approx. 15000 hardening litres
order number: 502-050
Dosing: approx. 10-100 ml per 100 l and week
5 litres 5fold concentrate
order number: 502-250
Dosing: approx. 2-20 ml per 100 l and week

Powder: Super-Calcium

750 g
order number: 582-008
20 kg
order number: 582-200
Dosing: approx. 1-10 g per 100 l and week

The *Turbo* Chalk Reactor and the Lime Water Reactor KWR also increase the calcium concentration.

Liquid product: Magnesium-plus

250 ml for approx. 750 hardening litres
order number: 517-002
1000 ml for approx. 3000 hardening litres
order number: 517-010
5 litres for approx. 15000 hardening litres
order number: 517-050
Dosing: approx. 10-100 ml per 100 l and week
5 litres 5fold concentrate for approx. 75000 hardening litres, order number: 517-250
Dosing: approx. 2-20 ml per 100 l and week

Powder: Super-Magnesium

750 g
order number: 584-008
20 kg
order number: 584-200
Dosing: approx. 1-10 g per 100 l and week

***Turbo*-magnesium** in the ***Turbo* Chalk Reactor** also increases the magnesium concentration

Trace elements

Both seawater and freshwater organisms depend on trace elements. AquaCare has chosen a composition for the trace element solution that supplies the aquarium with all important substances. These additives are necessary because the existing trace elements, caused by high oxygen concentrations or strong foaming, gradually change from the bioavailable form to an ineffective form. With regular dosing, all the organisms that assimilate nutrients through the water are optimally supplied. The trace elements are put together in ideal concentrations and protected with an organic complex for optimal bioavailability. The AquaCare solution contains the essential trace elements aluminium, boron, bromine, iron, fluorine, iodine, cobalt, copper, lithium, manganese, molybdenum, nickel, selenium, silicon, vanadium, tungsten and zinc.

Liquid product: Trace Elements

250 ml order number: 503-002
1000 ml order number: 503-010
5 litres order number: 503-050
Dosing: approx. 10 ml per 100 l and week
5 litres 5fold concentrate
order number: 503-250
Dosing: approx. 2 ml per 100 l and week

Strontium

Strontium (besides calcium) is the most important mineral for hard corals and other calcareous organisms. The animals will only grow satisfactorily in the long term if this substance is regularly added to the saltwater aquarium.

Liquid product: Strontium-plus

250 ml order number: 505-002
1000 ml order number: 505-010
5 litres order number: 505-050
Dosing: approx. 10 ml per 100 l and week
5 litres 5fold concentrate
order number: 505-250
Dosing: approx. 2 ml per 100 l and week

Powder: Super-Strontium

750 g
order number: 585-008
20 kg
order number: 585-200
Dosing: approx. 0.1 g per 100 l and week

Iodide / iodine

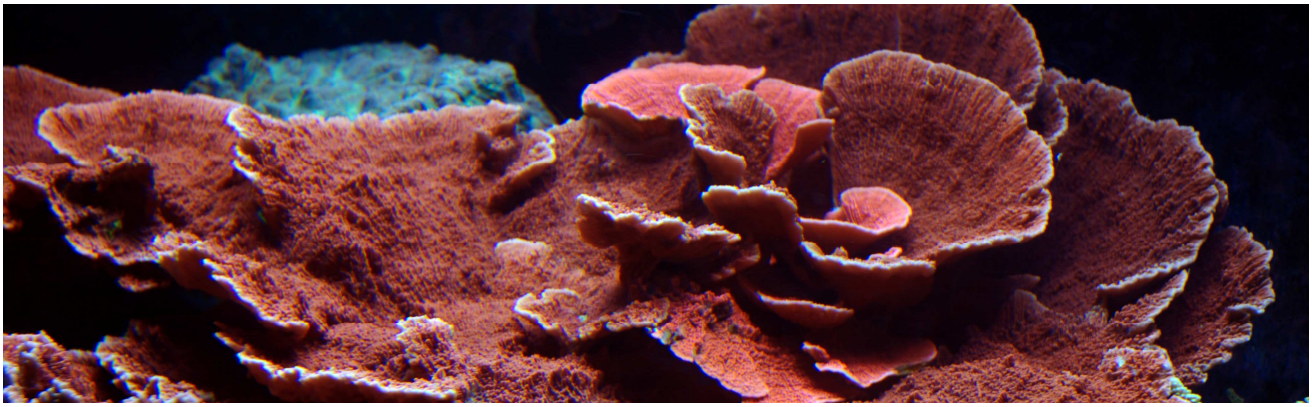
Iodine plays a major role in the hormone balance of seawater animals. Crustaceans, for example, cannot skin themselves without sufficient iodine. If you have many macro algae (e. g. *Halimeda*, *Caulerpa* or many brown algae) or disc anemones and xeniids in your aquarium, or if you filter with an algae filter, the algae can quickly consume the entire iodine concentration of the water. In this case, iodine should be supplied regularly from the outside. Especially after the use of activated carbon, iodine must be added to the water, as activated carbon adsorbs iodine very quickly and effectively. AquaCare offers two forms: the iodide solution for extremely safe use (for beginners) and the iodine-iodide solution (for professionals), which works very quickly but can also be easily overdosed.

Liquid product: Iodide solution

250 ml order number: 506-002
1000 ml order number: 506-010
5 Liter order number: 506-050
Dosing: approx. 10 ml per 100 l and week
5 litres 5fold concentrate
order number: 506-250
Dosing: approx. 2 ml per 100 l and week

Liquid product: Super-Iodine

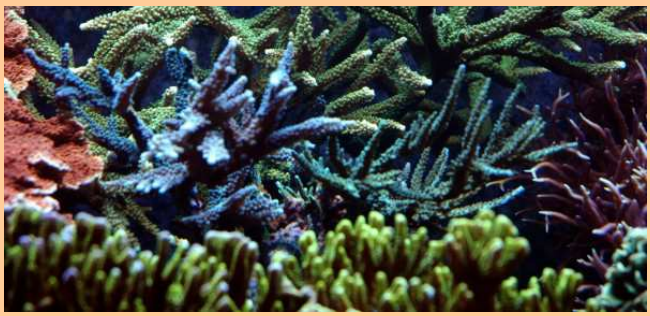
The AquaCare Super Iodine is highly active due to the very effective iodine-iodide-polyiodine formula without alcohol. Under no circumstances should an overdose take place!
30 ml order number: 521-001
250 ml order number: 521-003
1000 ml order number: 521-010
Dosing: 1 drop (50 µl) per 100 l and week



Iron-II

All plants and animals require bivalent iron for healthy growth. Iron-II from AquaCare is chelate-protected and is therefore not oxidized to useless trivalent iron. In seawater, iron can be used to enhance the colour of corals. Iron should not be used only at high nitrate and phosphate concentrations in order to prevent uncontrolled growth of green algae.

Liquid product: Eisen-II-plus
250 ml order number: 510-002
1000 ml order number: 510-010
5 litres order number: 510-050
Dosing: approx. 10 ml per 100 l and week
5 litres 5fold concentrate
order number: 510-250
Dosing: approx. 2 ml per 100 l and week



Vitamins

Vitamins are essential substances and cannot be produced by fish and other animals themselves. In the case of undersupply, deficiency diseases develop, e. g. pitting sickness in fish, malformations of the lateral line organ, fading of the colours.
The AquaCare multi vitamin concentrate can be added to the food as a preventive treatment. Dry and frozen food is supplied with the full range of essential vitamins.

Liquid product: Multi-Vitamin-Complex
30 ml, order number: 523-001
Dosing: 1-2 drops (50-100 µl) pro 10 g frozen food (1 frozen food cube) or 2 g flake food

Vitamins, amino acids and proteins = Amino@Vit

Filtering animals such as corals, gorgonians but also mussels and filtering worms depend on the supply of nutritious particles. Even zooxanthellate corals (corals with symbiosis algae), which in principle can only survive and grow with inorganic substances and light, require organic particles for sexual reproduction and particularly vigorous growth. AquaCare Amino@Vit also promotes micro-fauna, which is an important part of the natural food chain. AquaCare Amino@Vit is composed of high-quality and selected raw materials and is produced and mixed with a special process. The plant and animal ingredients meet the natural nutritional needs of aquatic organisms.

Suspension: Amino@Vit
250 ml, order number: 524-003
1000 ml, order number: 524-010
Dosing: 10 ml per 100 litre
2 × per day to 2 × per week

This product is also available as **Amino@Vit+Globuli** for the AquaCare globule reactor.

Coral Carrier

- Transport particles -

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Short Description

- Ideal means of transportation for organic and inorganic additives to small polyped (SPS), large polyped (LPS) coral, clams and soft corals.
- Compatible with trace elements, iodine solutions, vitamins and bacteria suspensions, and many more.
- Binding micro-particles and clearing water turbidity.
- Neutralizing unwanted acids.
- Stabilizing the water of fresh imports.
- May reduce cyano-bacteria.
- Dosing: 1-5 ml to 100 litres per application; according to demand daily to weekly.

Particles in natural sea water consist of organic (e.g. plankton) and inorganic substances; agglomerations between organic and inorganic particles are possible, too. If corals and other animals take in this particles all adsorbed substances are potentially available for the animal.

Coral Carrier has a calcium containing matrix in an optimum grain size of 0.9…25°µm, to give different animals best supply adequate to their needs. The large surface of *Coral Carrier* is adsorbing the added substances and brings them directly into the animals. – The lime component of Coral Carrier is able to bind unwanted acids and stabilizes the pH-value.

Plankton depending animals need organic and inorganic particles – like here in the pacific ocean, gulf of Alaska.
Picture: NOAA Office of Ocean Exploration.

Application:

Carrier: mix in a separate flask the wanted additive (e.g. vitamins) with 1 ml Coral Carrier per 100 litre aquarium water. After minimum 10 minutes adsorption time pour the mixture into the aquarium at a well waved place. Additives that are not combinable should be added successively.
Clearing the water: add 5 ml coral Carrier per 100 litres aquarium water per week. The water gets very clear after a short time of turbidity.

The turbid water is totally innoxious for animals. From time to time suck away the sediments in the ground.

Packing size:
1000 ml PET bottle (order number: 518-010), 5000 ml-PE canister (order number: 518-050)

Toxic-Ex

- the fast detoxication -

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Short description

- for fresh water, ponds and sea water
- eliminates fast and effective ammonia/ammonium
- bounds heavy metals (e.g. copper)
- bounds phenols and chlorine
- easy application
- over-dosing nearly not possible
- practical at fish imports (dropping method)
- eliminates medicine redidues (in particular colorants)
- stabilizes the water quality
- pure mineral ingredients (no chemistry)

During running-in an aquarium or after filtration accidents it is possible that high ammonia concentrations occure. Especially in sea water the high pH causes intoxications. If ammonia is not eliminated very fast losses are probable. Biofilter cannot react so fast to reduce the ammonia concentration. AquaCare Toxic-Ex takes effect within some hours and reduced considerable the deadly concentration. Toxic-ex should be available at every aquarium and pond at any time.

Foto: Hoebink

If you use tap water or well water for your animals, AquaCare Toxic-Ex should be dosed with every water change to reduce phenols, chorine and heavy metals.

Application:

At intoxication events or at too high ammonia concentrations put AquaCare Toxic-Ex directly into the aquarium or pond: the water gets cloudy. After some hours the water get clear again, because the solid of the product sediments. If possible suck the sediments with the next maintenance out of the system. Replicate dosings are not harmful.

Packing sizes:
1000 ml PET bottle (order number: 519-010),
5000 ml PE canister (order number: 519-050)
Dosing: 30 ml for 100 Liter

AquaCare Quality Salts

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AquaCare Sea Salt is packed in following sizes:

4 kg bag	10 kg bag
20 kg bucket	25 kg bag (other sizes possible)

Sea Salt

The AquaCare Sea Salt contains all macro elements (like sodium, chloride, etc.) in the same concentration as in natural sea water (see table). Trace elements are composed with more than 30 years experience. This has two main reasons: first, the concentrations of trace elements are varying in a wide range (factor 100) or the measuring techniques are not valid. Second, the consumption of the animals and losses with precipitation and co skimming demands an other composition than the natural combination. Long experiences in keeping and breeding of many animals underlines the high quality of AquaCare Sea Salt.

Cut of an AquaCare Aquarium

The advantages of AquaCare Sea Salt

- readily soluble in warm water,
- high concentration of soluble calcium i.e. with low calcium requirements and a regular partial water exchange of 10% per month, no post application of soluble calcium (AquaCare solutions V1 + V2 or calcite reactor) is necessary,
- all ingredients (salts) conform to the purity standards of the German and European Pharmacopoeia (DAB and Ph. Eur) and are therefore of high quality,
- many years of success in keeping and breeding confirm the AquaCare concept,
- different packet sizes at agreeable prices.

4 kg-bag .....Order number: 550-004
10 kg-bag .....Order number: 550-010
20 kg-bucket.....Order number: 551-020
25 kg-bag ..... Order number: 550-025

What is sea salt?

Sea water consists of numerous elements and compound. All over the world the ratio between this substances is nearly constant; only the absolute concentration differs.

The Salinity - a value for the salt concentration - differs from 39‰ (Red Sea) to about 0‰ (Baltic Sea). In the average the oceans contain 34,6‰ (Pacific), 34,8‰ (Indic) und 34,9‰ (Atlantic) at the surface. In lagoons the Salinity will be much higher.

Using natural sea water

Natural sea water seems to be the best solution to give marine animals best water quality. But only a few aquarists are able to get natural sea water from the ocean. In the last years the quality of costal water gets bad in many areas. Nowadays even big show aquaria has given up to get natural water. With artificial sea water the quality is better and more stable and lower quantities has to be stored.

Making of artificial sea water

To make artificial sea water you have to care some things, to get good sea water without irritating substances. Sea salt of good quality is easily dissolving in warm water. If white precipitations will occur at low temperatures or low CO_2 concentrations, aeration or a good current should eliminate these solid substances within some hours.

Element	Concentration in mg/l
Oxygen	857.000-880.000
Hydrogen	108.000-110.000
Chlorine	18.918-19.439
Sodium	10.500-10.809
Magnesium	1.261-1.350
Sulphur	884-905
Calcium	400-412
Potassium	380-389
	Concentration in µg/l
Aluminium	0-500
Antimony	0,24-0,33
Argon	4,3-600
Arsenic	3-22
Barium	2-93
Beryllium	0,0007-104
Bismuth	0,017-0,2
Lead	0,02-4
Boron	786-4.600
Bromine	58.651-67.000
Cadmium	0,02-0,25
Caesium	0,4-3
Cerium	0,001-0,4
Chromium	0,05-0,3
Dysprosium	0,000.9*
Iron	0,1-62
Erbium	0,000.8*
Europium	0,000.1*
Fluorine	1.271-1.300
Gadolinium	0,000.7*
Gallium	0,03
Germanium	0,05-0,07
Gold	0,004-0,027
Hafnium	0,007-0,008
Helium	0,006.8-0,006.9
Holmium	0,000.2*
Indium	0,000.1*
Iridium	
Iodine	48-80
Cobalt	0,035-4,1
Carbon DIC	26.939-28.543
Krypton	0,02-2,5
Copper	0,2-13
Lanthanum	0,003-0,3
Lithium	97-195
Lutetium	0,000.2*
Manganese	0,2-11
Molybdenum	0,24-12,2
Neodymium	0,003*
Neon	0,12-0,14
Nickel	0,8-5,4
Niobium	0,01
Osmium	0,004*
Palladium	
Phosphor	0-100
Praseodymium	0,000.6*
Protactinium	$5 \cdot 10^{-8}$-$2 \cdot 10^{-6}$
Mercury	0,02-0,03
Radium	$2 \cdot 10^{-8}$-$27 \cdot 10^{-8}$
Radon	$6 \cdot 10^{-8}$
Rhenium	0,1*
Rhodium	
Rubidium	112-200
Ruthenium	
Samarium	0,000.05*
Scandium	0,000.6-0,04
Selenium	0,09-4
Silver	0,05-1,5
Silicon	0-39.000
Nitrogen DIN	0-700
Strontium	8.100-80.000
Tantalum	0,002-0,002.5
Tellurium	
Terbium	0,000.1*
Thallium	<0,01-0,01
Thorium	0,01-0,05
Thulium	0,000.2*
Titan	1
Uranium	2-4,7
Vanadium	0,3-3,0
Wolfram	0,1
Xenon	0,05-0,052
Ytterbium	0,000.8*
Yttrium	0,001.3-0,3
Zinc	3,9-48,4
Tin	0,01-3
Zirconium	0,022-0,3

Composition of sea water with a Salinität von 35‰ after following authors (*only one value):
A. DEMAYO in WHEAST (ed.) et al. 1984: Handbook of Chemistry and Physics. 65th edition. Boca Raton, Florida: CRC Press./ SMITH, F.G.W. 1974: Handbook of Marine Science, Vol. II, Cleveland: CRC. in: TARDENT, P. 1993: Meeresbiologie. Eine Einführung. 2. Aufl. Stuttgart, New York: Thieme. / SPOTTE 1979 in ADEY, W. & LOVELAND, K. 1991: Dynamic Aquaria - Building living ecosystems. San Diego, New York, Boston, Sydney, Tokyo, Toronto: Academic Press, Inc. / SVENDRUP et al. 1942 in ADEY, W. & LOVELAND, K. 1991: Dynamic Aquaria - Building living ecosystems. San Diego, New York, Boston, Sydney, Tokyo, Toronto: Academic Press, Inc..

Sea water should be made in glass or plastic (poly ethylene PE, poly propylene PP, poly acrylic glass PMMA, or poly sterol PS) tanks. You should never use metal or weekender containing materials. Sea water is aggressive and is able to leach harmful substances out of false materials. The warmed water should have low concentrations of salt (low TDS or conductivity). The best way is reverse osmosis water or water conditioned with ion exchanger (mixed bed filter). If tap water is used many substances like fertilizers (nitrate, phosphate, silica acid) or rest concentrations of pesticides. These bad substances will promote blue green algae (cyano bacteria) or will damage sensitive animals. The Salinity of the fresh sea water should be controlled after one day. At 35‰ salinity sea water has a density of ρ_{20} = 1,0245 kg/l, a specific weight of 1,0301 kg/kg (20°C), a refraction index of n_{20} = 1,3393 and a electrical conductivity of κ_{20} = 47,5 mS/cm or κ_{25} = 53,9 mS/cm.

For an exact measurement of all above values it is important that the composition of artificial sea water is nearly the same than natural sea water. Otherwise the measurement of low quality sea water will be false. Aquaristic conductivity meters should be controlled and calibrated at 35‰ every month. If you calibrate below 30‰ these instruments (two-electrodes-technique or cell constants below 5/cm) will show 2-3 mS/cm less.

Refilling of evaporated water

The more light is over the aquarium the more water will evaporate. If you do not refill with pure water (R.O. water) the salinity will rise with the time. To refill the water you have to take water with very low salt content to prevent a changing in the salt components. Best way is a continuous refilling with an automatic refill system like the AquaCare *BasiTech*. If you refill manually pump the water slowly to the aquarium. Otherwise an osmotic shock will occur. Please check the salinity every month. If the salinity is to high take a little bit sea water out of the tank and refill it with R.O. water. If the salinity is too low, fill fresh sea water to the tank. The evaporation will rise the salinity.

Cut of a AquaCare Aquarium

Changing of water

A regularly water change is very important. AquaCare recommends minimum 1% per month even if robust animals are kept. If you keep sensitive animals 5 to 25% water change is the best way. The quantity depends on the concentration of nitrate and phosphate of the aquarium water. The more fertilizing substances are in the water the higher the water change.

Dosing of additives

Even you use a sea salt of high quality some important substances will be used very fast by corals. The more light is mounted the faster the substances will decline.

Dissolved chalk (hydrogen carbonate and calcium) should not be to low. Otherwise the pH value will oscillate very high and will hurt sensitive animals. The Carbonate hardness (KH) should never be below 7°dH, calcium not below 400 mg/l. If these factors will decrease - and in high productivity aquariums this will occur within 1-2 days - animals like *Tridacna*, hard corals, tube worms and algae like chalk algae or *Halimedia* have problems to survive. In a good working aquarium system with strong skimming trace elements, iodine, strontium and magnesium should be dosed, too, to prevent deficiency.

AquaCare *Mineral Salt*

Acropora colonies at low tide

The AquaCare *Mineral Salt* is used to harden up soft water, e.g. R.O. water. For soft water aquaria like Amazonian tanks a minimum of hardness is useful. With this *Mineral Salt* it is possible to bring hardness and important minerals into the very poor R.O. water. If you need higher degrees of hardness and a higher pH value you can dose more of the salt. Fishes of the East African sees like Tanganyika and Malawi has ideal conditions with the combination of R.O. water and AquaCare *Mineral salt*: the pH is over 7 and stable and additionally the salt concentration is higher.

For sea water aquaria you can use the AquaCare *Mineral Salt* to bring minerals into the aquarium. If you use the solutions V1 (KH-plus) and V2 (Calcium-plus) in high amounts you can prevent the changing of the salt water composition if you use the *Mineral Salt*, too.

Composition of the *Mineral Salt*

The AquaCare *Mineral Salt* contains following substances:
Borax, Calcium, Carbonate, Chloride, Hydrogen Carbonate, Hydroxid, Potassium, Magnesium, Sodium, Sulphate.

20 grams (ca. 2 tea spoons) AquaCare *Mineral Salt* to 100 litres water* raises following values:

Total Hardness: ..... about 3°dH
Carbonate Hardness: ..... about 1°dH
electrical conductivity, 25°C: ..... 300 µS/cm
pH value: ..... about 8,1

* this is for Reverse Osmosis water at 25°C. If the water is colder or if you use very high dosing of the Mineral Salt some substance will not dissolve totally. The precipitates are not harmful for animal, plant and micro organisms. The pH will change in the aquarium because natural biological processes like plants growth and filter bacteria will occur.

750 g AquaCare *Mineral Salt* ..... Order number 571-008
15 kg AquaCare *Mineral Salt* ..... Order number 571-150

Filter materials

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Trickling filter material for high hydraulic loads

- light protection for bacteria even if the filter is not light-tight
- high biological effective surface
- low blocking danger
- good de-aeration and high oxygen supply
- large free space
- material made of inert polyethylene
- very high radial forces possible (320 Nm/cm), so suitable for very high hydraulic loads

Technical data:
Dimensions: ..... d16 × 20 mm
Weight: ..... 98 kg / m^3
Surface (biological effective):
..... 500 m^2/m^3
Number of pieces: ..... 161,000 / m^3
Free volume: 90%
Material: ..... polyethylene
Order number:
1 liter..... 591-001
other sizes on request

Filter material with very high free space

- very high free volume, therefore:
  - high hydraulic loads possible
  - any anoxic conditions
  - ORP is not reduced even after long operation time
  - any blocking possible
- perfect oxygen supply and de-aeration: balanced gas equilibrium
- made of inert and virgin polypropylene: any organic material or colours will reach the water
- height filter bed heights: any solidification of the material
- sharp edges therefore: intensive drop creation and distribution in the filter bed
- ideal for overflows and trickling filters for sea water

Technical data:
Dimensions: ..... 27×27 mm
Weight: ..... 72 kg / m^3
Surface
(biological effectiv): ..... 180 m^2/m^3
Number of pieces: ..... 44,500 / m^3
Free volume: 92%
Material: ..... Polypropylene virgin
Order number:
5 liter: 590-005
10 liter: 590-010
200 liter: 590-200

Quartz sand for moving bed reactors and sand filter

- sharp edged gravels
- graining 0,4...6 mm
- for moving bed reactors and for sand filters
- larger graining for support layers of other filters

Technical data:
Silica oxide: .....ca. 98%
Bulk density: .....ca. 1.5 kg/l
Solubility: ..... < 0.01 g/l
pH-value: .....neutral
Graining:.....0.4...0.8 mm
.....0.7...1.3 mm
.....1...2 mm
.....2...3 mm
.....3...6 mm

Turbo-Calcium granules for lime reactors and mineral filters

- porous and very pure calcite granules for all lime reactors and mineral filters
- about 5...11 time faster dissolving compared to other materials
- phosphate-free
- normally round form; suitable for high velocity technique, e.g. AquaCare Turbo lime reactor

Technical data:
Calcium carbonate (Calcite): 97%,
Magnesium carbonate: 2,1%
Graining: ..... 3-5 mm,
Bulk density: .....ca. 1250 g/l
Order number:
2,5 kg bag 560-003
15 kg box 560-015

Turbo-Magnesium granules for magnesium supply

- porous and round material
- better dissolving than other materials, e.g. dolomite
- phosphate-free
- ensure the magnesium supply of a reef aquarium
- raises the pH value

Technical data:
Magnesium oxide: 70-75%
Calcium oxide: 4-5%
Fe_2O_3, Al_2O_3, SiO_2.....3-4%
glow loss.....16-20%
Graining: ..... 2-5 mm
Bulk density: .....ca. 1300 g/l
Order number:
2,5 kg bag 561-003
15 kg box 561-015

Calcium carbonate rubbles (grey) for de-acidification

- sharp rubbles
- good de-acidification
- very pure
- suitable for mineral filters and de-acidification columns after sulphur filters (autotrophic de-nitrification)
- substrate for highly buffered water (east African cichlids)

Technical data:
Calcium carbonate: 99,1%
Magnesium carbonate: 0,4%
Fe_2O_3, Al_2O_3, SiO_2 ..... <0,5%
Graining: .....5...8 mm
other grains on request
Bulk density : ..... ca. 1400 g/l
Order number:
1 t on a pallet 562-000

Calcium carbonate rubbles (white) for de-acidification

- sharp rubbles
- good de-acidification
- very pure
- suitable for mineral filters and de-acidification columns after sulphur filters (autotrophic de-nitrification)
- substrate for highly buffered water (east African cichlids)

Technical data:
Calcium carbonate: 99,1%
Magnesium carbonate: 0,4%
Fe_2O_3, Al_2O_3, SiO_2 ..... <0,5%
Graining: .....3...6 mm
other grains on request
Bulk density : ..... ca. 1400 g/l
Order number:
1 t on a pallet 566-000

Coral gravel for sea water tanks

- natural porous material
- different graining available
- order quantity: min. 1 ton

Technical data:
Calcium carbonate: ..... main component
impurities: ..... variable

Activated carbon for sea water

- phosphate-free – algae will not be enforced
- fast degassing and therefore immediately ready for action
- pH and ORP neutral
- low dusty concentration – crystal clear water
- high adsorption capacity - long life time
- large free volume – low danger for blocking
- steam activated hard coal
- suitable for chlorine elimination,
  tannin elimination,
  ozone destruction and
  as biological substrate

Technical data:
Cylindrical form, ø ca. 4 mm,
Dust..... < 1%,
Bulk density..... 470±20 g/l,
Water content .....< 5% (w/w),
Ash .....< 5% (w/w),
Surface (BET) ..... 1000±50 m^2/g,
apparent density.....ca. 0.8 kg/l

Order number:
1 liter..... 573-005
25 kg (ca. 50 l) 573-250

Sulphur for de-nitrification filters (nitrate filters)

- ideal for autotrophic de-nitrification
- low dissolving, extremely low pollution of the water
- high strength, suitable for high water velocities
- normally round form reduces the hydraulic resistance

Order number:
1 liter (1,2 kg).....575-010
25 kg (ca. 21 liters) 575-250

Technical data:
Graining.....3...8 mm
Form: .....normally round
Purity: ..... min. 99,8%
Ashe/carbon/H_2SO_4 .....max. 0,09%
Bulk density: .....ca. 1200 g/l
usual in the trade free of arsenic, selenium, tellurium

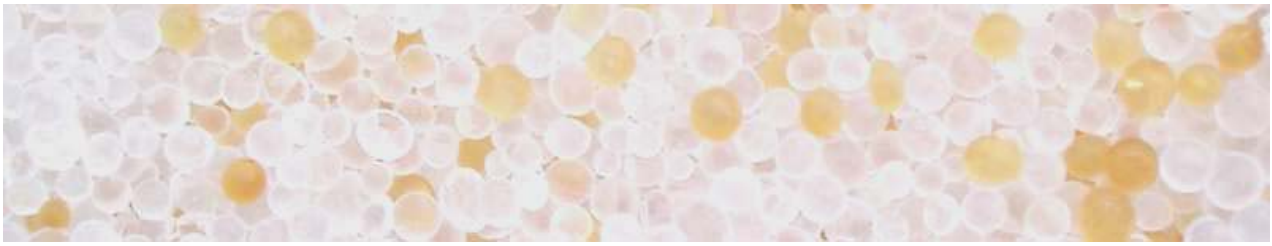
Adsorption material for removing phosphate

- high adsorption power
- safe adsorption
- dust-free
- regular size: perfectly suitable for moving bed technology
- any iron release
- any discolouration

Order number:
1 liter 578-010
28 liters.....578-280

Technical data:
Matrix: ..... porous polystyrene impregnated with iron hydroxide nano particles
Size: .....0.4...1.2 mm
whole balls: ..... min. 95%
Bulk density: ..... 790...820 g/l
Temperature range: ..... 0...80°C
pH range: .....4.5...8.5
Salinity: .....0...40/1000

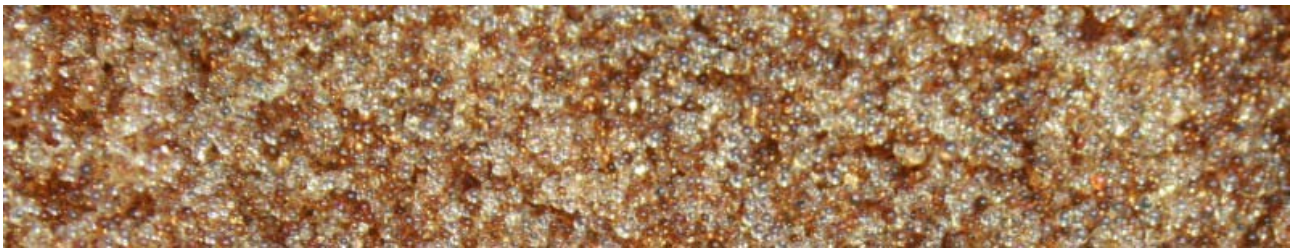
Drying pearls for reducing the air humidity



- ideal for drying air
- dry air will enlarge the power of ozone generators
- with humidity indicator (orange = o.k.; colourless = charged)
- will be regenerated in the oven at 130...140°C

Technical data:
Material: ..... silicon oxide (amorphous)
Bulk density: ..... 0.8 kg/l
Content indicator pearls: 17%
Regeneration frequency: ..... min. 10 times
Order number:
2 kg 577-002

Mixed bed for producing ultra pure water



- ideal in combination with reverse osmosis technology
- suitable for simple analytic purposes
- eliminates salts
- eliminates silicic acid – ideal for sea water production
- simple control with electrical conductivity

Technical data:
Type: ..... desalination in H^+, OH^- form
strong acid component: ..... 38...42%
strong basic component: ..... 56...62%
Bulk density: ..... 665...740 g/l
max. operation temperature: ..... 60°C
minimum conductivity of produced water:
..... < 0,01 µS/cm
Order number:
1 liter 580-002
25 liters 580-025

Calcium hydroxide for producing lime water („Kalkwasser“)

- raises the pH value
- precipitates phosphate
- any raising of buffer capacity (KH, alkalinity), but raises the calcium concentration
- ideal for AquaCare lime reactor KWR
- high purity

Technical data:
Quality: ..... ultra clean
Content: ..... minimum 95%
Heavy metals as lead: ..... < 0,001%
HCl insoluble ..... < 0,2%

Order number:
500 g 570-005
8 kg 570-080

Block Filter:

for eliminating sediments, chlorine and organic trace substances

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The AquaCare block filter is developed to give the aquarist a simple and fast method to clean up the tap water. This filter filters particles with a size of over 5 µm from the tap water. Additionally gaseous dissolved materials are adsorbed at the special coal. Depending on the water flow even trace substances can be effectively removed such as pesticides and medicine. The large advantages against the reverse osmosis technology is the low operating pressure (starting from 0,5 bar) and the 100%ige water use. Salts such as hardness, nitrate and silicic acid cannot be removed however with this filter. Often this is also not desired. If salts should be removed, we recommend the reverse osmosis technology.

The block filter consists of a pressure resistant and transparent filter housing that can be installed e.g. at the wall. Inside the housing there is the special combination filter. It consists of a pressed activated carbon block with asymmetrical pore structure, i.e. outside are the larger pores, that collects the bigger particles; further inside the small pores filters out small sediments. If the block filter cartridge is used up (water does not flow any longer correct or the filters become unattractively brown or red; at least after 6 months) only the cartridge must be changed.

Technical Data of the AquaCare Block Filter:

Size	**10“ Block Filter**	**20“ Block Filter**
Order number	208-011	208-012
Operation pressure (at 20°C)	0.5...10 bar	
Operation temperature	1...30°C	
Pore size of cartridge	5 µm	
Capacity of the cartridge	20.000 liters	40.000 liters
Interval for changing the cartridge	After 6 months or after reaching the maximum capacity	
Max. water flow for sediment and chlorine filtration	500 l/h	1000 l/h
Max. water flow for eliminating organic substances	5 l/h	10 l/h
Suitable pass meter	3-24 l/h; order number: 312-003	
Material of filter housing	PP, PVC	PP, SAN
Material of cartridge	Sintered activated carbon block made of mineral coal and coconut	
Dimensions D × H	12 × 31 cm	12 × 57 cm
Delivered parts	3/4" tap water connector, 5 m PE tube 10 mm, 5 m PE tube 6 mm, valve, bracket with pegs and screws, instruction manual	
Spare filter cartridge, order number	221-105	222-105

If you want to eliminate even hardness, salts and other ions, please ask for AquaCare reverse osmosis units with a capacity from 30 l/d to 250 m^3/h.

Reverse Osmosis

an easy and safe technology

AquaCare GmbH & Co. KG
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if small or large R.O. units the principle is the same

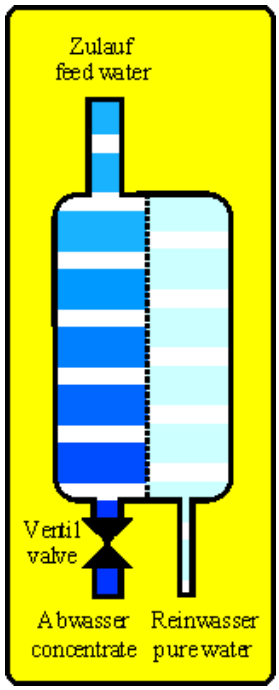
The principle of reverse osmosis technique

The reverse osmosis (R.O.) technique is an extreme fine filtration and is therefore called hyper-filtration, too. The well known filtration techniques do not need water pressure in contrast to R.O. technique. The R.O. membrane has a very fine structure with semi-permeable properties. This special characteristic allows to invert the natural phenomenon osmosis.

Osmosis is an autonomous material migration through semi-permeable membranes. If two aqueous solutions with different ion or substance concentrations are separated with a membrane both solutions try to equalize the different concentrations. The ions or substances are not able to pass the membrane, so the water must flow from the low concentrated side to high concentrated side. This phenomenon runs so long if the concentrations on both sides are equal or the pressure on the low concentrated side is as high as the osmotic pressure of the high concentrated side.

In nature this principle is very important for all plants and animals. The cell pressure (turgor, osmotic pressure) is regulated by transporting only ions or molecules – the water will flow by itself.

The reverse osmosis technique inverted this process. On the side with the high concentration (concentrate side) a high pressure is established. The only way to get the system in equilibrium is that the water passes the membrane to the low concentrated side (permeate side or pure water side). The ions and molecules are not able to pass the membrane in considerable extent. To prevent that the concentration on the concentrate side is rising and rising a part of the concentrate must be drained – this brine passes the concentrate valve.



The rejection of the different ions and molecules is varying depending on the size (molecular weight), the charge (uncharged, dipoles, mono-valent or multi-valent ions) and the structure of the substance. The used pressure in the system depends on the feed (fresh water, brackish or sea water), the used membranes and the recovery of the system. For example: a fresh water systems works with 4 to 16 bar, a sea water system needs minimum 40 bar to negotiate the osmotic pressure of the concentrate.

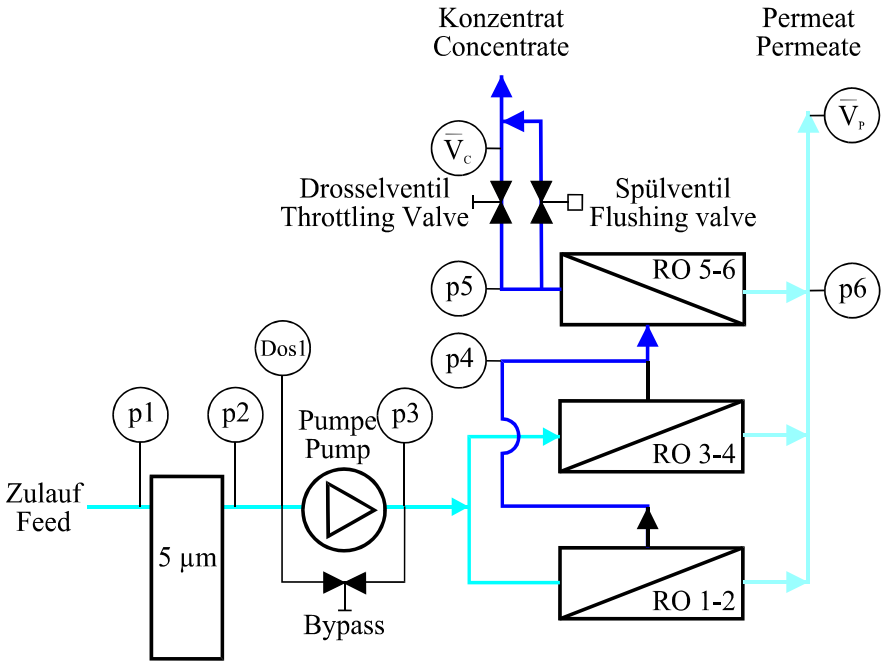
To guarantee a long life a reverse osmosis system some important terms must be redeemed:

- the water must be particle-free → a sediment filter with 5 µm must be installed
- the water must be free of oxidizing agents, e.g. chlorine → activated carbon

filtration is necessary
- the dissolved salts should not precipitate while concentration at the membrane → the right recovery must be calculated exactly and anti-scaling substances must be dosed or the water must be softened with a ion exchange unit
- all materials must be suitable for the concentrate → plastics, stainless steel at low chloride concentrations (fresh water), duplex steel at high chloride concentrations (brackish and sea water)
- the main components and parameters must be controlled to ensure a proper running of the system.

Process with AquaCare units (type HP)

If the unit is starting an automatic feed valve opens and the incoming water will be cleaned by a 5 µm sediment filter. A dosing station pumps antiscaling substances into the feed water tube. For best intermixing a static mixer is installed. Only if the antiscalants are mixed very well a proper running of the unit is guaranteed. Alternative softened water can be used with small units. After pre-pressure control the water flows into the main pump. AquaCare is working only with high pressure circulation pumps made of stainless steel. Noise and vibrations are very low to ensure a long life time of the components. The high pressure tube made of austenitic stainless steel 1.4571 (316 Ti) guarantees a long life time without pitting corrosion. After passing the membranes the permeate flow is monitored; a counter pressure is inhibited by a check valve. The concentrate flow is adjusted by a gate valve or needle valve and monitored by a flow meter. Before and after operation the unit flushes the membrane with feed water. All components are controlled by a micro-processor unit or optional by a PLC. The conductivity is shown in the display. If the adjustable maximum limit is reached the unit shuts down automatically.



p = pressure gauges; RO = reverse osmosis module; V = flow meter; Dos = dosing pump

CIP-units (clean in place)

During operation of a R.O. system the membranes will foul although antiscalants are dosed or softened water is fed. With the time inorganic substances and bio films will be taken up by the membranes. Therefore once to three times a year – depending on quality of antiscalants, maintenance of the unit, and of course of the feed water quality – the membranes must be cleaned with chemicals. After the cleaning process permeate flow and rejection of the membranes are quiet better than before cleaning.
For cleaning the tubes of the R.O. system are dismantled and the flushing adapters of the CIP (**C**lean **I**n **P**lace) connected. The CIP consists of a tank, a chemical resistant pump, a sediment filter and a flow meter.
The pump pushes the cleaning solution through the connected R.O. vessels. The detached dirt will be caught by the sediment filter. The inorganic crusts will be dissolved. After cleaning the R.O. membranes the chemical should be neutralized. After flushing the membranes with permeate and re-connecting to the R.O. main system the R.O. unit can be started again.
CIP-units are only profitable with large R.O. systems.

Reverse Osmosis Units

Type *Excel*

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All reverse osmosis units type *Excel* of AquaCare are equipped with a mounting plate, that contains all parts. A 10” combi filter (5 µm sediment filter and activated carbon) in a white housing (option: clear housing) eliminates all particles and oxidizing substances like chlorine and ozone. The reverse osmosis module is equipped with a low pressure high qualitiy TFC membrane and a flushing valve to ensure best quality. Sope of delivery: 5 m PE pressure tube, tap water connector ¾”, wrench for filter and membrane housing, mounting material, detailed instruction manual.

reverse osmosis unit *Excel*
with clear housing and pressure gauge
(modifications possible)

The advantage of reverse osmosis

- Reverse osmosis is an efficient membrane filtration technique which reliably removes hardness and detrimental substances such as nitrate, silicic acid, pesticides and traces of pharmaceuticals from drinking water and effectively retains bacteria, viruses, algae, protozoa and radioactive particles.
- Easy to operate: no addition of chemicals – no electrical supply (standard types)

The advantage of an AquaCare reverse osmosis unit at a glance

- The units are equipped with an combi filter to remove chlorine and sediments to protect the reverse osmosis membrane.
- Only the best quality polyamide / polysulfone membranes (TFC) are used: rejection 95-98%*; 90 to 1000 liters of pure water per day*; realistic concentrate / pure water ratio of 3:1; special types with 1:1 (50% recovery)
- The built-in flushing system considerably increases the life of the membrane.
- All tube connections with reliable and efficient AquaCare push-fit connections; complete installation material for easy assembly
- *Excel* units can be supplied with a lot of equipment.
- Made in Germany.

Reverse Osmosis Units

Type *Excel* 1:1

Reverse Osmosis Units with 1:1 Technique

The *Excel* series 1:1 are reverse osmosis systems on a white mounting plate similar to the basic model of *Excel*. An additional low-voltage-pressure pump is mounted, which enables a concentrate recirculation. Therefore AquaCare is able to implement small systems with a concentrat-permeat-water ratio of 1:1 (50% recovery). A run-dry protection (at less than 1 bar) saves the booster pump against running-dry. The 1:1 systems is expandable with a reverse osmosis control (No. 600-005) and a conductivity measurement (610-010).

Reverse Osmosis Unit *Excel* 1:1 (modifications possible)

Technical Data of *Excel* and *Excel* 1:1

	***Excel* 90**	***Excel* 240**	***Excel* 660**	***Excel* 180 1:1**	***Excel* 360 1:1**	***Excel* 1000 1:1**
Order number	101-009	101-024	101-060	105-018	105-036	105-100
Daily flow in l/d*	90	240	660	180	360	1000
Extendable	yes		no	no		
Feed pressure	3…8 bar			1...6 bar		
Booster pump	no			yes		
Typical operation pres.	3...8 bar (see feed pressure)			approx. 8 bar		
Rejection	95-98%					
Pre-filtration	10“ pre-filter with 5 µm sediment filter and activated carbon					
Life time pre-filters	ca. 6...12 Monate					
Membrane type	Low pressure spiral wound (TFC) membrane of polyamide-polysulfone					
Membrane size	1812-36	1812-100	2012-300	1812-50	2012-100	2812-300
Flushing system	manually (automatically on request)					
Water production	manually (automatically on request)					
Ratio concentrate-permeate, approx.	**3:1** fixed			**1:1** fixed		
Recovery, approx.	**25%**			**50%**		
max. feed hardness	20°dH			15°dH		
Weight	3.9 kg		4.8 kg	6.9 kg		
Maße: B×H×T	41 × 41 × 15 cm					
Electrical connection	-			230 V 50/60 Hz		
Electrical power	-			30 W		120 W

*permeate flow ±15% at 4 bar feed pressure, 15°C and 500 mg/l total dissolved solids (TDS)

Reverse Osmosis Unit

Excel-Turbo 50 to 150*

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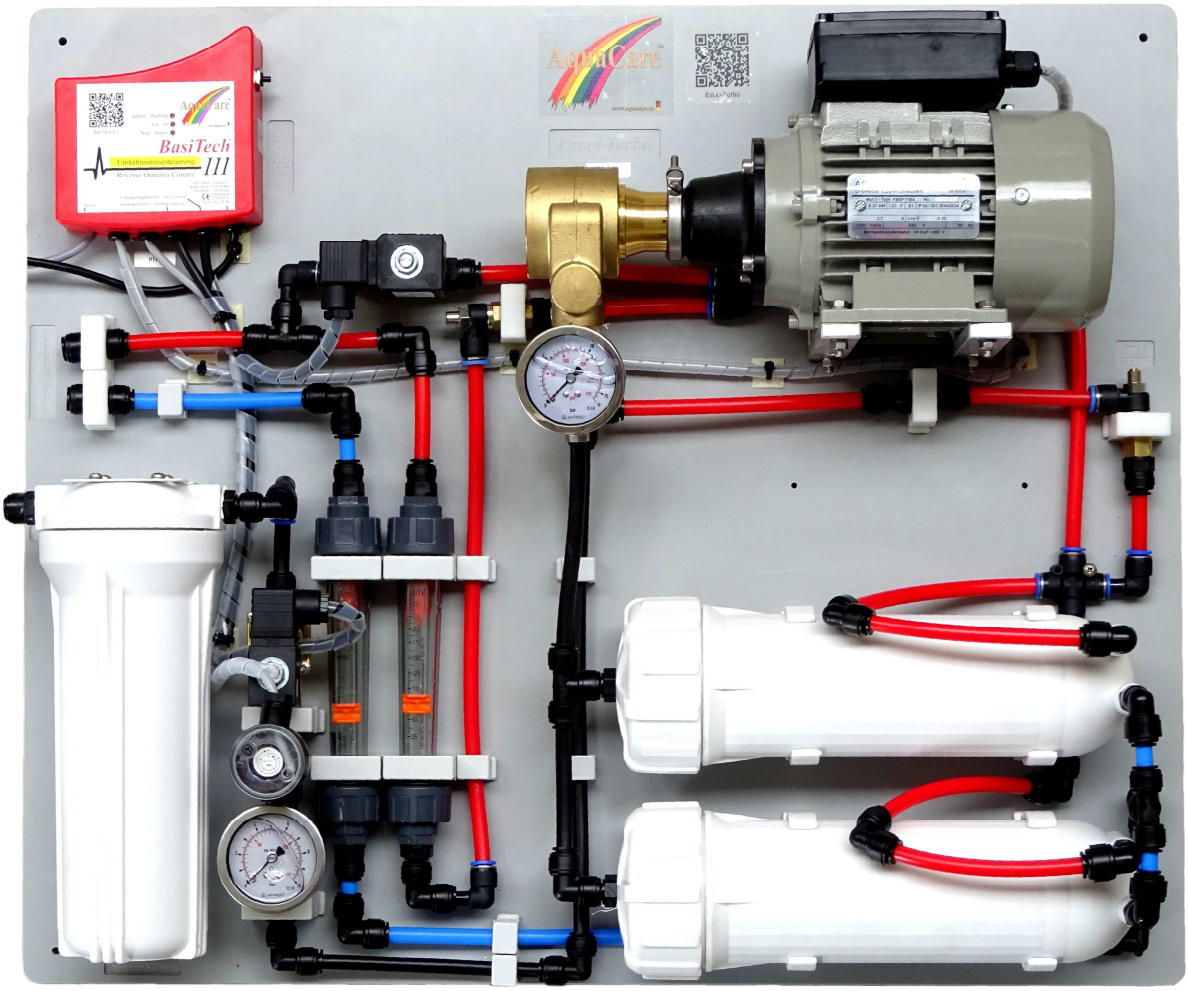

modifications possible

Field of application for type *Excel-Turbo*

If the water flow of the models *Excel* is not enough or the pre-pressure of the feed line is below 3 bar the model *Excel-Turbo* is the right choice. This unit is equipped with all necessary parts for a safe and long operation. The *Excel-Turbo* is suitable for continuous work.

Equipment

- integrated booster pump (professional industry type) for high flow and good recovery – depending on feed water quality up to 75%
- booster pumps with run-dry protection and motor overload switch
- automatical filling of a pressure-less tank (Min-Max control)
- two glycerol filled pressure gauge for filter pressure and operation pressure
- concentrat recycling for high cross-flow and long life time
- water water and operation valve for precise adjustment
- two flow meters for permeate (pure water) and concentrate (waste water)
- compact design

* Angabe ±15% bei 2 bar Vordruck, 15°C, Abwasser-Reinwasser 1:1 und einem Salzgehalt von 500 mg/l; Rückhalterate gemessen über Leitfähigkeit

Technical data of model *Excel-Turbo*			
Model	Excel-Turbo 50	Excel-Turbo 100	Excel-Turbo 150
Order number	102-050	102-100	102-150
Flow* in litres / hour	50	100	150
Daily flow* in l/d	1200	2400	3600
Rejection*	95 - 99% depending on recovery (recovery depending on feed water quality)		
Operation temperature	5 to 35°C		
Pre-pressure	1...6 bar during operation		
Operation pressure	typically 8 bar		
Construction	Board unit (wall mounting)		
Type and materials of pump	Roto-vane pumpe, housing made of brass (stainless steel on request), water touched materials: brass / stainless steel and wasserberührte Teile aus Messing / Edelstahl und graphite		
Motor	One-phase motor, IP 44, 1425 min^{-1}, self-ventilated, overload protected, suitable for continuous operation		
Waste water – pure water - ratio	3:1 to 1:1 (depending on feed water quality)		
Recovery	25 to 75% (depending on feed water quality)		
Type & material of module	Spiral wound module made of polyamide-polysulfone (TFC)		
Number of moduls	1	2	3
Size of modules	2812		
Pre-filtration	10" combifilter (activated carbon + sediment filter 5 µm)		
Water touched materials	Polyamide, Polyethylene, Polypropylene, NBR and pump materials		
functions	Automatical filling of a press-less tank (Min-Max control) with detection of wrong conditions; run-dry protection		
Electrical connection	230 volts, 50-60 Hz (others on request)		
Connected load in kW	0.25	0.37	
Water connections	10 mm PE pressure hose (push fit fittings)		
Dimensions (L×W×D), mm	750 × 590 × 200		
Weight in kg	20	22	23

* at 15°C, 2 bar pre-pressure and 500 ppm TDS; Data will vary with other feed water conditions.
Attention! Inlet water quality: iron < 0.1 mg/l, manganese < 0.05 mg/l, barium and strontium not detectable, chlorine <0.1 mg/l if any activated carbon filter is mounted at inlet, maximum 2,000 µS/cm (1,300 ppm); SDI_{15min}<3.0. The feed water should not contain bacteria with numbers more than recommended in drinking water ordinance.
Modifications possible

* Angabe ±15% bei 2 bar Vordruck, 15°C, Abwasser-Reinwasser 1:1 und einem Salzgehalt von 500 mg/l; Rückhalterate gemessen über Leitfähigkeit

Ultra Pure Water Filter

eliminates nitrate and silica

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pressure-resistant 10" ultrapure water filter in PP housing

The advantages of the AquaCare Ultra Pure Water Filter

- at silica concentrations (silicate) of more than 5 mg/l or nitrate concentrations of more than 50 mg/l in tap water
- ultrapure water for simple analytical tasks
- is connected directly behind a reverse osmosis unit
- is sufficient for approx. 1,000 litres of ultrapure water* (10" filter)
- Disposable resin (no regeneration required; higher capacity; lower residual conductivity)
- easy exchange of resin
- Simple control of effectiveness via electrical conductivity possible

Technical data of the resin

Ion exchange mixed bed resin type 1 (demineralizer in H+, OH- form)
38...42% strongly acidic component and 56...62% strongly alkaline component,
Bulk density 665...740 g/l,
max. operating temperature 60°C,
Minimum electrical conductivity for reverse osmosis operation* < 0.1 µS/cm

Technical data of the 10" filter

Order number	**BM001PP**
Volume, ca.	0,7 litres
Capacity *	1,000 litres
Service life **	6...7 months
Pressure (20°C)	0…8 bar
Temperature	4...35°C
order number 2 litres ultrapure water resin in PE bag	580-002
order number 25 litres Ultrapure water resin in PE bag	580-025

* at 15 µS/cm reverse osmosis water
** at 5 litres water per day

* with water of an R.O. unit with a permeate conductivity of 15 µS/cm (25°C); at higher conductivities it will be less

Pressureless ultrapure water filters made of acrylic glass

For larger requirements the acrylic glass filters from AquaCare are available. They are available in three heights. These filters are not pressure resistant!

Type	MB002PMMA MB003PMMA MB004PMMA	MB005PMMA MB009PMMA MB013PMMA
Reactor height	50 cm 70 cm 100 cm	
Useful volume, approx.	2.1 litres 3.2 litres 4.9 litres	5.5 litres 8.7 litres 13,4 litres
Capacity, approx.*	3000 litres 4500 litres 7000 litres	6700 litres 10500 litres 16000 litres
Minimum electrical conductivity	< 0,1 µS/cm	
Footprint size	21 × 15 cm	31 × 22 cm
Materials	PMMA (Acrylic glass), NBR, silicone, PA	
Weight	3.6 kg 4.7 kg 6.6 kg	8 kg 10.7 kg 15 kg
Connectors	of your choice	

Pressure-resistant ultrapure water filters made of FRP from 4 to 250 litres content on request.

Example for a 45 litre ultrapure water filter completely mounted on a reverse osmosis rack.

* with water of an R.O. unit with a permeate conductivity of 15 µS/cm (25°C); at higher conductivities it will be less

Conductivity Meter for Ultra Pure Water

Type	¼“ connector for small filters	½“ connector for FPR filters
Order number	610-010	610-011
Measuring range	0.00...19.99 µS/cm	
Resolution	± 0.01 µS/cm	
Accuracy	± 2% of range	
Temperature compensation	automatically at 5...50°C with 2,4%/°C	
Alarm	with LED	
Probe	two-electrode-technique with 2 m cable	
Power supply	External with 12 V adapter (within the scope of delivery)	
Ambient conditions	0...50°C; RH 100%	
Dimensions	86 × 94 × 33	
Weight	150 g	

Reverse Osmosis Technique

To produce pure water gets more and more important with increasing concentrations of harmful substances in the tap water. Many aquarists have to produce pure water with reverse osmosis units. The advantages of this technique: simple to handle, high rejections of substances, no chemical compounds, automatically operation possible.

Harmful substances

But in some areas tap water contains high concentrations of silica and nitrate. Silica is used to take care the tap water system of corrosion. Sometimes you can measure more than 20 mg/l (ppm) silica in tap water. Nitrate is a problem caused by the agricultural industry. In German tap water 50 mg/l is the maximum concentration - in the European Community 25 mg/l.

If the tap water contains more than 50 mg/l nitrate of more than 5 mg/l silica the best low pressure reverse osmosis unit is not able to reduce these substances below a harmless concentration for marine aquariums. Good units reduce nitrate and silica only to 80-90%.

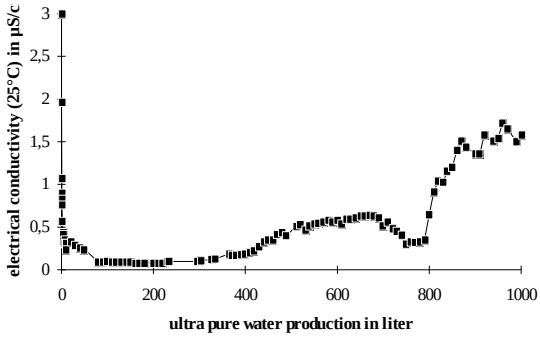
If you use water with nitrate and especially silica a massive population of algae (green, blue green and diatoms) can grow. Most times you can see them as a greasy dark brown and green film that grows over stones, sand and animals. If these films get to thick they can kill bentic animals like corals. Additionally these films does not look good.

Ultra Pure Water Filter

The AquaCare Ultra Pure Water Filter contains a resin that changes positive ions (cations) with H^+ and negative ions with OH^-. The changed H^+ and OH^- combine to neutral water H_2O. The result is water of over 99.9% quality without salts like silica and nitrate. The ultra pure water is of best quality for fresh and sea water, tropical plants and technical purpose.

The AquaCare Ultra Pure Water Filter is easy to install. You have to mount it simply after a reverse osmosis unit (30…160 liters per day for 10” filter).

If you use AquaCare reverse osmosis unit Excel 30 to 160 on the mounting plate is enough place to fix the Ultra Pure Water Filter. If the reverse osmosis unit runs the filter produces ultra pure water without harmful substances.



Ultra pure water quality of an AquaCare filter fed with reverse osmosis water of 15 µS/cm.

Time to change

The quality of the ultra pure water can be measured with a good electrical conductivity meter. If the conductivity is above 3-5 µS/cm you have to change the resin. To measure regularly concentrations of silica or nitrate is possible, too. If you can measure these substances you have to change the resin.

Capacity of the AquaCare 10” Ultra Pure Water Filter:

conductivity feed in µS/cm	10	**15**	20	25	30	35	40	50
capacity in liter	1500	**1000**	750	600	500	430	380	300

* with water of an R.O. unit with a permeate conductivity of 15 µS/cm (25°C); at higher conductivities it will be less

Microfiltration
the perfect pre-treatment

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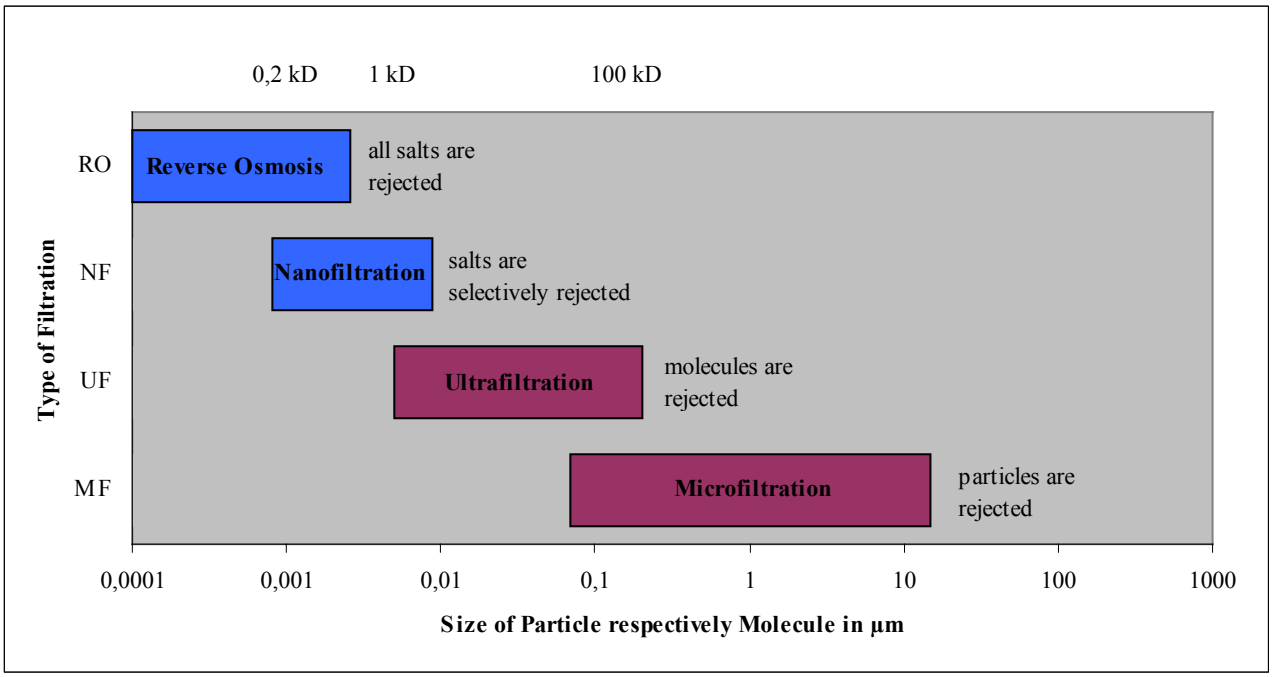
MFW20: Microfiltration unit with booster pump

MF90: Microfiltration unit without booster pump

Overview: Microfiltration – Ultrafiltration – Nanofiltration – Reverse Osmosis

The distinction between the different types of the membrane is not clear. Sharp boundaries are not existing. Therefore the terms becomes indistinct.

The most simple classification is done by the rejected substances. With microfiltration exclusively particles are rejected - diffusion processes do not play a role. With the finest microfiltration membrane some of the largest molecules are rejected - the range of ultrafiltration begins. The most common parameter for characterising an ultrafiltration membrane is the "molecular weight cut off" MWCO. The unit is Dalton (D) respectively kilo-Dalton (kD). If a membrane has a MWCO of 100 kD, 90% (in some extent 95%) it will reject 90% of the particles with a moleculare weight of 100 g/mol. Larger particles are rejected better, smaller particles worse.

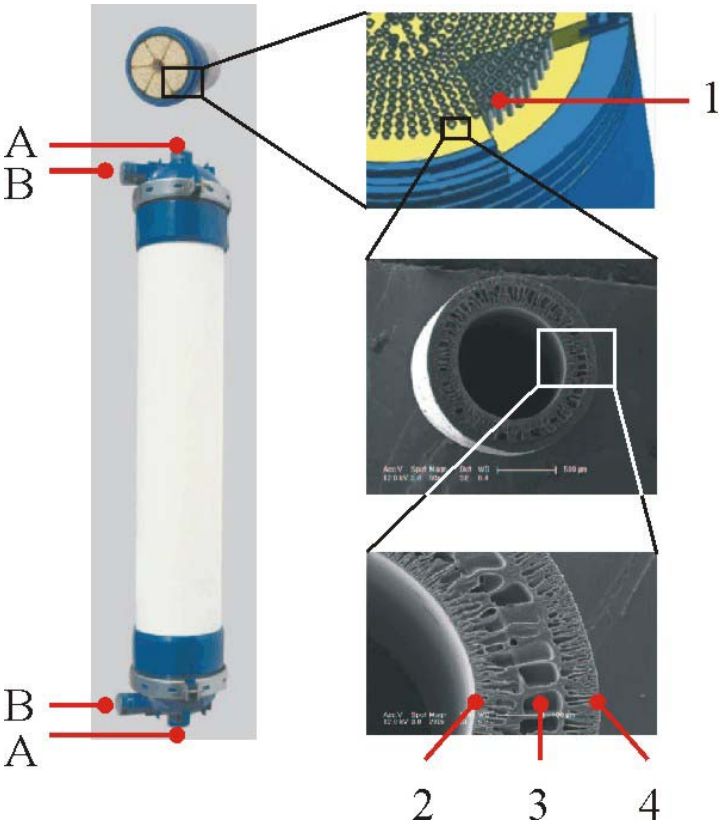


Some producers of membranes counts ultrafiltration to the range of microfiltration, because predominantly hydraulic processes occur that affect flow and rejection. In the lower range of pore size diffusion processes becomes stronger and hydraulic processes take a beck seat.

By some authors the transition to pure diffusion membranes (reverse osmosis) is called nanofiltration. Here some of small molecules and large salts are rejected at least partial. Large salt ions like calcium and sulfate are rejected to high amounts (e.g. 95%), smaller ions like sodium and chloride has only rejections of 40-60%.

If smaller salts are rejected to high percentages the range of reverse osmosis is reached. In this range only diffusion processes are important. Pores, that you imagine as small holes, are not existing. Only gases are diffusing nearly untouched. For this reason permeate of a reverses osmosis membran has a lower pH than the feed water: the carbonic acid in form of carbon dioxide diffuses through the membrane, in contrast the buffer capacity (e.g. hydrogen carbonate) not. The carbon dioxide in the permeate forms carbonic acid and lowers the pH.

From microfiltration to reverses osmosis the needed pressure is rising. Microfiltration is normally done under or slightly over 1 bar, because only the mechanical resistant of the membrane must be overrided. Reverse osmosis need in the extrem range (landfill seepage water) up to 200 bar. The higher the salt concentration the higher the osmotic pressure the higher the needed operation pressure for the membrane.



Structure of a hollow fibre module

A: Feed water and concentrate
B: Filtrate (Permeate)
1: single hollow fibre
2. inner surface of a hollow fibre
3. support of the fibre
4: outer surface of a hollow fibre

Hollow fibre modules and spiral wound modules for standard R.O. housings are available, too.

Field of application

Microfiltration for aquaristics is not very common - until now. But for some applications nearly sterile water makes sense. For phytoplankton breeding it is very important that foreign organisms are not introduced. Even one "wrong" algae may overgrow the wished culture.

If you breed fish larvae introduced bacteria, protozoa, predacious copepodes and other parasites may kill the defenseless breed and a lot of work is destroyed. Alternatively you can use fresh mixed sea water. But this must mature and you must adapt the quality carefully to the old water. Mistakes may kill the breed.

In "naked" quarantine systems (without ground, without porous material, but with currents) microfiltration may effectively filter out pathogen swarmers and destructive bacteria, even large

viruses are rejected. For very sensitive organisms a microfiltration unit reduces the losses compared to medical treatments.

Operation of a unit

Microfiltration is a very fine filtering system. All particles (even large colloids) over 0.1 µm, bakteria and large viruses are rejected and washed out with the concentrate flow. The rejection is about 95% and higher, compared to 10-25% with reverse osmosis (without antiscalling substances). The concentrate is normally put back into the main aquarium system.

Technical data

Type	**MFW-0020**	**MF090-100**
Flow*	with sea water about 6-10 litres per hour with built in pump; maximum 40 litres per hour (with pre pressure)	max.1025 litres per hour sea water at 2 bar
Pre filtration	100 µm (washable)	on request 100 µm
Type of operation	Cross flow or dead end	
Recovery	95-99%	
Membrane type	spiral wound module	hollow fibre module
Membrane material	polysulfone	PVC modifiziert
Membrane size	1812	UF90
MW Cut Off (MWCO)	ca. 100 kD	ca. 100 kD
Pore size in nm	ca. 100 nm	ca. 100 nm
Material of housing	PP	PVC and ABS** on request in PMMA (acrylic)
Dimensions in mm	410 × 410 × ca. 150	490 × 1200 × ca. 200
Weight in kg	6	14

* at 25°C

** you may glue connectors made of ABS with PVC glue

UV Systems

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- Simpel operation and maintenance
- Display of function with LEDs
- Suitable for tap water, fresh and reverse osmosis water
- High grade materials (stainless steel, quarz)

The radiation with UV light is suitable for reducing bacteria, viruses and protozoa (e.g. special stages of fish parasites). Die UV rays destroy the DNA of organisms and causes the death of the cells. The disinfecting with UV light generates no chemicals and is suitable for aquaria, too. The stainless steel version is not suitable for sea water tanks, because pitting corrosion will occure.
These UV systems are suitable for applications in drinking water and fresh water field. The massive housing resists pressures up to 7 bar and is therefore applicable for R.O. system. The UV lamp is seperated from the water by a quarz glass – maximum safety is achieved. The normal operation of the system is displayed with a green LED at the electronical balast. If the system fails a red light is flashing and a beeper sounds. It is very easy to change the lamp, any special tools are not necessary. The interval for cleaning depends on the quality of the water.

Type	6W	55W
Order number	UV-6	UV-55
Max. flow with pure water	1.5 l/min – 90 l/h	36 l/min – 2160 l/h
Max. flow with R.O. water	1.9 l/min – 114 l/h	45 l/min – 2400 l/h
Max. aquarium volume	600 litres	5500 litres
Water connection	¼“ female thread	¾“ male thread
Total length / length between connectors	ca. 280 / 165 mm	ca. 1000 / 825 mm
Diameter of lamp	51 mm	63 mm
Power density	> 30 mW/m^2	
Life time of UV lamp	ca. 8000 h*	
Connected load	6 W	55 W
Electrical connection	180-230 V, 50...60 Hz	
Output current	42 mA	250 mA
Material of housing	AISI 304 – DIN 1.4301	
Weight	0.9 kg	3.0 kg

* depends on operating frequency

Operate the UV lamp only if it is fully assembled! UV rays will cause burns on skin and retina.

Pumps

for aquaristic purpose

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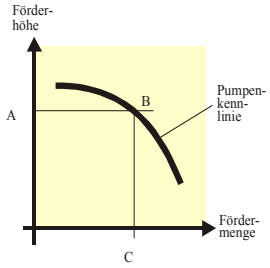
Pumps are used for very different purposes in aquaristic: whether for pumping air into simple air-lifts or high-end high-power industrial pumps. The quality differs extremely and you must decide what item is the best for your application.



For **lifting water** from the filter tank to the aquarium (overflow system) you must take care that the pump has enough water flow at the required water column.

How much water a pump is able to lift is seen in the pump diagram (see picture). First measure the height between the water level of the filter tank and the level inside of the aquarium. In the diagram read the height at point (A) at the Y-axis. Draw a horizontal line (A-B) until it will cut the diagram. At this point draw a vertical line (B-C). The point (C)at the X-axis is the maximum water flow of the pump. It is important that the real water flow will be lower because of the resistance of the tubing.

Basically a pump should never be throttled at the incoming side (suction side).

For **currents** inside the aquarium the pumps should have a high water flow and a low pressure. Pumps with its motor outside of the water are very favourable because the consumed energy that is converted into heat energy will be blown out into the air and not into the water. Especially in summer this advantage is very important.

As a general rule the water flow between filter tank and aquarium should be about 5 times the aquarium volume. The current inside the aquarium should be about 10 times of the volume.

Overview of aquaristic pumps:

picture	type	cost price	energy costs	purpose	advantage	disadvantage
	circulation pump with synchronous motor*	⊕	⊕	water flow current	submersible	all the heat is given to the water; not controllable*
	magnetic coupled pump with asynchronous motor	⊖	⊕/⊖		rigid; less heat is given to the water; controllable	high price; not submersible
	Energy-saving, controlled pump Blue Eco	⊖	⊕⊕		Less heat is given into the water; incl. controller; high flows	high price
	tube dosing pump	⊕/⊖	⊕	dosing of additives	lower cost price	low accuracy
	membrane dosing pump	⊖	⊖		very good accuracy	high cost price
	diaphragma pump	⊕	⊕	reverse osmosis units	low cost price; very silent	not suitable for continuous operation; low performance
	roto-vane pump	⊖	⊖		high performance; suitable for continuous operation	high cost price; not silent
	membrane pump with small capacity	⊕	⊕	air supply	silent; very low cost price	low power;
	piston pump with small capacity	⊕/⊖	⊕/⊖		extremely silent; good performance	high cost price
	blower pump with small capacity	⊕	⊕/⊖		very high performance	very loud; low air pressure

* only with very costly technique possible

Pumps
for Aquaria

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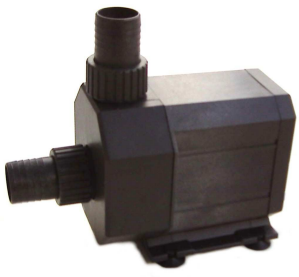
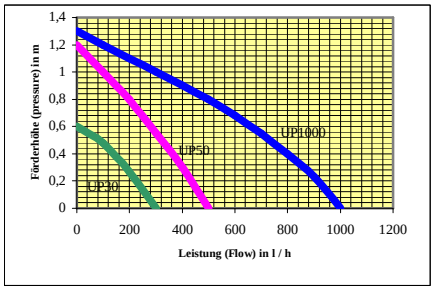
„aquabee“– submersed operation possible

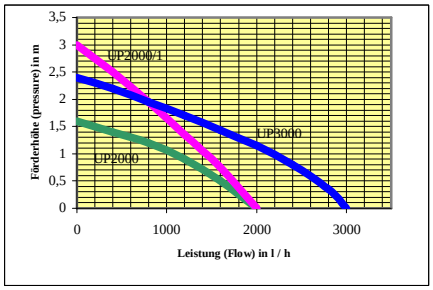
Submersible magnet-coupled centrifugal pump with energy-saving synchronous motor; (not suitable for conventional interval controls)

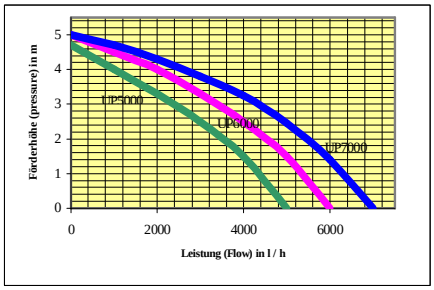




	UP300	UP500	UP1000	UP2000	UP2000/1	UP3000	UP5000	UP6000	UP7000
Order number of pump	FR305	FR505	FR1005	FR2000	FR2000/1	FR3000	FR5000	FR6000	FR7000
Maximum flow in l/h	300	500	1000	2000	2000	3000	5000	6000	7000
Maximum pressure in m	0,6	1,2	1,3	1,6	3,0	2,4	4,7	5,0	5,0
Electrical connection	230 V 50 Hz (other voltage, frequency and plug on request); 1,1 m cable with Schuko-plug								
Power consumption in W	4	5	10	18	38	45	75	100	125
Dimension without connectors L×W×H in mm	80 × 60 × 90			105 × 87 × 105			148 × 90 × 128		
Mass in kg	0,65			1,10			1,72		
Connectors	13 mm		16,8 mm	20 mm or M23 × 1,5 female thread			27 mm or PVC d25		
Bearing: axis / sleeve	polished ceramics / PEEK			ceramics / ceramics					
Water touched materials	ABS (can be sticked together with PVC glue), silicone rubber, NBR rubber								
Scope of delivery	Strainer, angle 45°, mounting support with silicone feed, bracket, air injector			Strainer, mounting support with silicone feed, bracket			mounting support with silicone feed, adapter to PVC tube d25		
Order number of Tube connector d20/25	-			FR2000.21 (UP2000+3000) FR2000/1.21 (UP2000/1)			-		
Order number of spare rotor	FR 305.12	FR 505.12	FR 1005.12	FR 2000.13	FR 2001/1.13	FR 3000.13	FR 5000.13	FR 6000.13	FR 6000.13







Energy Saving Pumps
for small Aquaria

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Energy saving pump series „e“– submersed operation possible

Submersible magnet-coupled centrifugal pump with energy-saving technique and low voltage controler and run-dry protec-tion

Order number of pump	UP5000e	UP8000e	UP11000e
Maximum flow in l/h	5000	8000	11000
Maximum pressure in m	4.0	4.0	7.0
Electrical connection	110-240 V 50/60 Hz; electronical transformer with Schuko-plug		
Power consumption	30 W	50 W	130 W
Dimension without con-nectors L×W×H in mm	145 x 90 x 130	160 x 115 x 150	160 x 115 x 150
Mass in kg	2.0	3.3	3.3
Connectors	25 mm	40 mm	40 mm
Bearing: axis / sleeve	ceramics / ceramics		
Scope of delivery	Pump, controller, electronical transformer with cable		
Order number of spare rotor	FR5000e.14	FR8000e.14	FR11000e.14

Scope of delivery of UP5000e: pump, low voltage controller, transformer, connectors

Large magnetic coupled pumps for sea water

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Series MX

- Magnetic coupled
- Silent operation
- For corrosive media and sea water
- Different bearings possible
- Low wearout
- High efficiency
- Simple maintenance
- Energy saving motor as an option

The MX series is the latest development in magnetic coupled plastic pumps. The field of application are heavy duty conditions. Equipped with carbon bearings it is possible to stand run dry condition. The new self-cooling structure in combination with the proven contact-free principle and the twofold bearings improve the attributes against cavitation and nearly closed pressure side. The spiral wound two-part housing is saving energy. On request the pumps is equipped with energy saving motors, that enhance the efficiency, too.

Type	**MX400**	**MX401**	**MX402**	**MX403**
Max. flow in m^3/h	16.8	19.2	27	30
Max. pressure in m	12.5	17.5	27	31
Electrical connection in kW	0.37	0.75	1.5	2.2
Voltage, frequency	3P 400 V 50 Hz			
Connection IN × OUT	G1.5“ × 1.5“	G1.5“ × 1.5“	G2“ × 1.5“	G2“ × 1.5“
Max. specific weight of medium	1.2 kg/l			
Weight in kg	6,2	10,2	13,5	14,5
Dimensions L × W × H in mm	424 × 140 ×219	473 × 160 × 249	479 × 260 × 274	479 × 260 × 274
Material housing, impeller	Fibre reinforced polypropylene (GFRPP) (ethylene-tetrafluor-ethylene EFFE possible)			
Material magnetic capsule	Polypropylene PP			
Material O-Ring	FKM (EPDM, Aflas possible)			
Material shaft, forward ring	Aluminium ceramic			
Material bearing	Carbon (PTFE, Aluminium ceramic, SiC possible)			
Material rear ring	Carbon reinforced Polyphenylene sulphide CFRPPS (carbon reinforced polyetheretherketone CFRPEEK possible)			
Ambient temperature	0...40°C / 32…104°F			
Medium temperature	0...80°C (10...80°C with Aflas-sealing) 32…175°F (50…175°F with Aflas-sealing)			

series MDM

The MDM series is equipped with high grade plastics like PFA and ETFE. The versions with carbon bearings are able to stand short run dry periods. The very strong magnet inside the magnetic capsule hinders contact with the surfaces in the rear and front parts of the pump. High temperature that melts the plastics are prevented.

Max. flow in m^3/h	12...72 m^3/h
Max. pressure in m	9...74 m
Material housing, impeller, magnetic capsule	Carbon reinforced ethylene-tetrafluor-ethylene CFRETFE or fluoro plastics FPA
Material bearing	High density carbon or silica carbide SiC
Material shaft, run up ring, rear ring	Ultra pure aluminium ceramic or silica carbide SiC
Material rear run up ring	Polytetrafluor-ethylene PTFE or silica carbide SiC
Sealing	Polytetrafluor-ethylene PTFE
Temperature range	-20...105°C / -4...220°F (ETFE) -20...120°C / -4...250°F (PFA)
Max. pressure range	10 bar (normal type) 16 bar (high pressure type)

series MDE

Max. flow in m^3/h	30...240 m^3/h
Max. pressure in m	25...57 m
Material housing, impeller, opening disc, magnetic capsule	ETFE/PFA (PVCF possible)
Material bearing	SiC (PTFE possible)
Sealing	PTFE
O-Ring	Kalrez (FKM, EPDM possible)
Temperature range	0...100°C / 10…212°F (ETFE) 0...120°C / 10…250°F (PFA)
Max. pressure range	10...16 bar (depending on type and version)
Options	Leaking sensor, bearing wearout sensor, bearing temperature sensor, flushing circle for washing out particles, pump inlet rim for improve the NPSH

Hose Dosing Pump

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1 channel hose dosing pump

Hose dosing pumps are suitable for aquaristic purposes. You can run them for nearly all media used in this field and they are very rigid. You can drive this pump with calcium mixers, calcium reactor, nitrate filters and phosphate filters – all applications with less but constant water flows for a long time.
The rigid gear with synchronous motor realizes a long life time – even at continuous operation. The special hose made of Norpren lasts 30 times longer compared to silicone hoses. The pump come from industrial production and stands heavy duty purposes.
The unit pumps constant 50 ml/min = 3 l/h (1,7 fl.oz / min = 0,8 US gal / h). For lower doses you can use a simple timer with a resolution of one minute.
For perfect refilling the evaporated water you can use the AquaCare dosing pump with the *BasiTech* level control.

Technical data for hose dosing pumpe

Order number	402-100
Flow	50 ml/min = 3 l/h 1,7 fl.oz / min = 0,8 US gal / h
Pump type	Hose dosing pump
Hose material	PharMed BPT 8 × 5
Life time	About 3 months at continuous operation
Ambient temperature	10…50°C
Electrical connection	230 V, 50 Hz, 5 W

Membrane dosing pumps on request

Air:
Membrane pumps and Compressors

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Small membrane pumps for aquaristics

These small and dependable membrane pumps are used for many different purposes in aquaristics: aerating of water, water flow with the means of an airlift, aerating algae tubes, stripping off surplus gases (neutralization stage of the AquaCare *Turbo* Chalk Reactor).

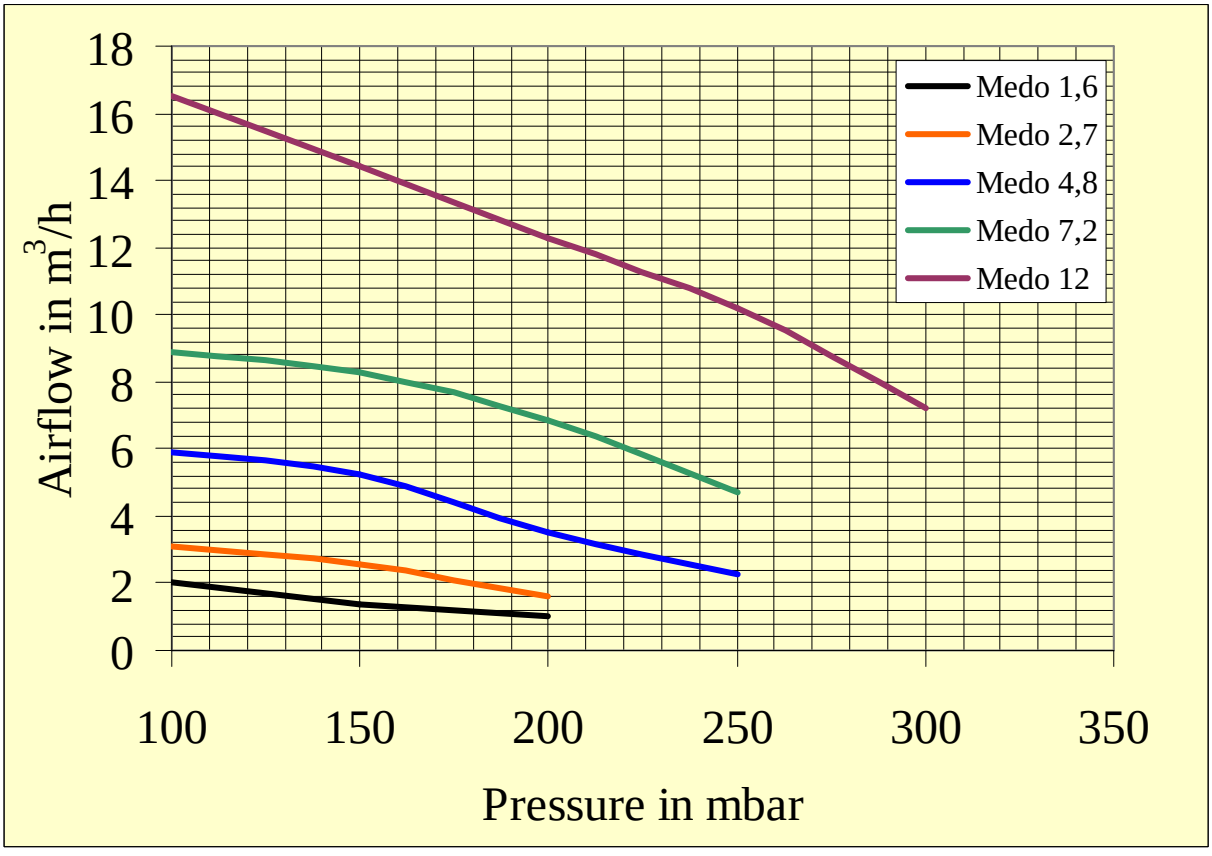
Please install the pumps above the water surface to prevent back flowing water. Check valves are another way to protect the pumps against damages.

Model	**Schego optimal**	**Schego M2K3**	**Schego WS3**
Foto			
flow adjustable	yes	yes	yes
max. flow l/h	250	350	350
max. pressure in mbar			300
sound level in dB(A)	39	36	
connector in mm	4		
housing	plastic		
dimensions (L × B × H) in mm	130 × 70 ×50	170 × 75 ×60	170 × 75 ×60
length of cable	1 metre		
weight in kg	0.6	0.95	0.95
electrical connection	220-240 V, 50 Hz		
electrical load in W	5	5	5

Extreme silent air compressor for larger air flows

The medo-compressor 1.6...7.2 are very silent units. They are made for heavy duty application. The models 1.6 and 2.7 are equipped with teflon plated aluminium pistons driven with a linear motor. The larger models are equipped with a high efficiency membrane. All models are very silent (38…48 dB(A)) and do not need oil. So they are perfectly fit for supplying skimmers, *Turbo* chalk reactors, air stones, algae cultures, air lifts, etc..

Model	**Medo 1,6**	**Medo 2,7**	**Medo 4,8**	**Medo 7,2**	**Medo 12**
flow at nominal pressure in m^3/h	1.7	2.7	4.8	7.2	12
max. pressure in mbar	300	400	350	400	350
nominal pressure	110	110	150	180	200
sound level in dB(A)	38	38	45	48	
connector	18 mm			26 mm	
weight in kg	3.5	3.5	6.0	7.0	12.3
electrical connection	230 V, 50 Hz				
electrical load in W	29	47	86	130	215



Heating & Chilling

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Heater made of glass and other materials

AquaCare offers heater made of glass, porcelain, PTFE (Teflon) and stainless steel. You can choose between 500…5,000 W power.

Technical Data

Diameter of the heaters in mm:
Glass and porcelain Ø 48;
PTFE Ø 49,
stainless steel Ø 42;
power cable 1.5 m with Schuko-plug (other connectors on request)
starting with 1,500 W 3P-Version (400V) available, too.

Power in Watt	Length in mm*	Immersion depth in mm*
500	350	250
750	450	350
1000	600	450
1500	600	450
2000	800	600
2500	800	600
3000	800	600
5000	1100	900

* applies to glass heaters.

The heater has to be immersed minimum to the minimum immersion depth during operation. Before putting out of the water the heater has to cool down for minimum 15 min. Connections has to be done by authorized personnel in accordance with local regulations only. The heater should be protected by installation of a run dry protection, installation of the level control, installation of a thermal protection. Fragile heater have to be protected against mechanical forces.

Heat exchanger made of plastic for heating and chilling

Titanium and plastics are the main materials for heat exchangers used in sea water tanks. Titanium has a higher heat transfer coefficient and so the dimensions are smaller. The pressure losses of titanium exchangers are normally higher. Titanium is under suspicion to shed metal ions into the water. These ions may accumulated and hurt sensitive sea animals.
Heat exchangers made of PE-RT are totally inert, that means that any substance will reach the water. Disadvantage is the lower heat transfer coefficient that causes larger dimensions of the units. Exchangers made of PE-RT (RT-plastics have a higher heat transfer coefficient that normal PE) are perfectly suitable for sea water tanks.

Dimensioning

For dimensioning a heat exchanger we need following data for an offer:

- Maximum water temperature of the aquarium
- Water flow of the main pump that should be connected to the heat exchanger
- Temperature of the cooling / heating medium (e.g. well water)
- Needed power in kW of the exchanger: for a rough calculation please add the power of all pumps and lights

Technical data

The pressure lees at the aquarium side is only some mbar; in the other side only some 10 mbar.
Material: PE-RT; maximum pressure 8 bar at 20°C, 6 bar at 40°C, 4 bar at 60°C, 2 bar at 90°C

BasiTech™

- the small Jack-of-all-trades -

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The advantages of AquaCare *BasiTech* units

- easy handling
- micro controller technique with safety programming
- SMD components
- long cables
- only 5 volts at swimmer switches
- electronic timer: cares the conducted component
- light emitting diodes (LED) for visual control

Level control / skimmer shut off

The level control is suitable for filling a tank or aquarium automatically. The level switch has to be mounted at the maximum water level of the tank and to be conducted with the *BasiTech*™ housing. After power supplying and connecting the refill pump of solenoid valve the green LED will flush. If the water level drops the *BasiTech*™ control activates the yellow LED and the output channel. The conducted pump refills the tank. If the level switch is reached the pump will stop.

Picture: AquaCare

You can use the unit for a skimmer, too. If a skimmer is not controlled properly, too much wet foam will be produced and fill up the foam cup immediately. To prevent a water spill the *BasiTech*™ unit shuts off the air pump of the skimmer or the water inflow pump of it. Therefore the level switch must be mounted into the skimmer foam cup.

Order number: 600-002

Pump run dry protection

Most aquaristic pumps are circulation pumps that will not run dry for a long time. If the pump sucks air it will be destroyed. The level switch of the *BasiTech*™ unit must be mounted at the minimum water level of tank that is connected with the pump. The pump has to be connected with the *BasiTech*™ output. If power is supplied the pump will run and the green and yellow LED flush. If the water level drops below the level switch (leakage, evaporation) the unit shuts off the pump and the yellow LED. The pump will not start again if the level switch is reached again. This function prevent the continuous start and stop of the pump: normally if the pump stops water will flow back to the pump chamber from the aquarium. To activate the pump again you have to disconnect and to connect again the *BasiTech*™ unit.
Order number for circulation pumps: 600-003
Order number for pressure pumps
(e.g. R.O. booster pumps): 600-004

Reverse Osmosis control

The new AquaCare *BasiTech*™ reverse osmosis control realizes three functions:

Level control

The AquaCare *BasiTech*™ control fill up pressure-less tanks automatically. The inlet valve is mounted between pre-filtration and R.O. module. It is very easy with the delivered push fit fittings. The automatic flushing valve takes over the function of the manual flushing valve of the R.O. unit. Two sensors – a minimum and a maximum level switch – are mounted in the pressure-less tank. The suitable holder is available at AquaCare. After installing the above components the R.O. unit is able to work automatically. – If the water level is falling below the minimum sensor the R.O. units begins to produce water. If the maximum level switch is reached it stops. The distance between minimum and maximum sensor should be as large as possible to ensure best water quality. Only aquaria with a size of minimum 1000 liters may filled up directly – for such occasions change the minimum sensor against a unit without moving parts. Fill up smaller aquaria only with the *BasiTech*™ level control.

Automatically flushing

To conserve the sensitive R.O. membrane and to ensure best water quality the *BasiTech*™ R.O. control realizes a flushing function. During start and stop and every 30 minutes the flushing valve opens for 30 seconds to flush out unwanted substances.

Standby flushing

If the R.O. unit is on standby for a longer time the water inside the unit begins to rot. To prevent this situation the *BasiTech*™ R.O. control flushes for 30 seconds if the R.O. unit is not producing water for longer than 24 hours.
Order number: 600-005

Holder for level switches

The holder consists of a massive PVC basis with a 20 mm tube. One or more level switches must be fixed at the tube. The height is controlled with a plastic screw.
Order number: 602-001

Refractometer

for safe and easy determination of the salt content of sea water

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Advantage of the AquaCare Refractometer for Sea Water

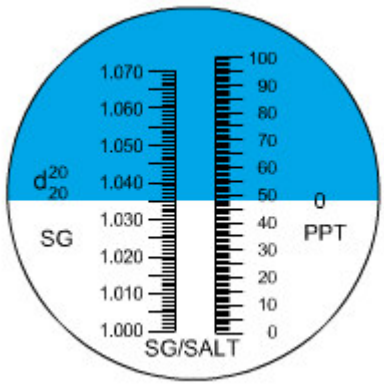
- Automatically working temperature compensation (10 – 30°C)
- Easy calibration
- Quick results
- Best overview with two scales (salinity and specific gravity)
- Small sample volume
- High precision
- Working without electric current

Methods for measuring the salinity:

Method	Principle	Advantages	Disadvantages
Hydrometer	The buoyancy of a float depends on the density of the liquid	simple method; cheap	very fragile; only long hydrometers are precise enough sensitive to dirt not temperature compensated
Electrical conductivity	The salinity changes the electrical conductivity	works in very low-salt and high-salt water	expensive; aquaristic units are not precise; needs energy
Refractometer	The salt content changes the optical refraction	simple method; cheap; needs no energy; easy to read the value; temperature compensated	sensitive optics

Technical Data:

order number: 620-010
range salinity: ..... 0...100 ppt or 0...100‰
range specific gravity: ..... 1.000...1.070 kg/kg
resolution: ..... 1 ppt / ‰ or 0.001 kg/kg
accuracy: ..... ±1 ppt / ‰ or 0.001 kg/kg
temperature of calibration: ..... 20±1°C
temperature for measuring: ..... 10...30°C
temperature for storing: ..... 4...40°C
weight: ..... 200 g



scale of AquaCare refractometer

TDS Stick

(electrical conductivity)

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Why should I measure TDS?

For controlling a R.O. unit you can easily measure the electrical conductivity or the concentration of **T**otal **D**issolved **S**olids = TDS. If you have this value of the feed water and the pure water you can calculate the general rejection. If the rejection is high (more the 95%) the pure water has a good water quality, if not you must check the pre filter and/or the membrane.

Handling

For a measurement you take the TDS stick from its bag. After removing the protective cap you can dip the stick directly into the water. Press on "on/off" and the measured value in ppm appears. If you can not dip the stick at the same time into the water and read it off, it is possible to press during immersing the "hold" key. The measured value is frozen and can be read off also outside of water.

Technical Data of the AquaCare TDS Stick

Indicating range	0 – 9,990 ppm corresponds 0 – 12,890 µS/cm
Resolution	1 ppm (0-999 ppm) 10 ppm (1,000-9,990 ppm)
Accuracy	5%
Functions	automatic range measurement of TDS freezing function of value
System	two-electrode system
Material of electrode	stainless steel
Accessories (in series)	bag with clip table for calculation TDS to electrical conductivity at 25°C
Voltage supply (part of delivery)	2 pieces batteries size 357A (diameter 11.5 mm; height 5 mm)
Dimensions L × W × H in mm	160 × 35 × 40
Weight (with bar) in g	73

For high precision measurement please ask for our WTW measuring systems

Push Fit Fittings made of POM

for compressed air and aqueous solutions

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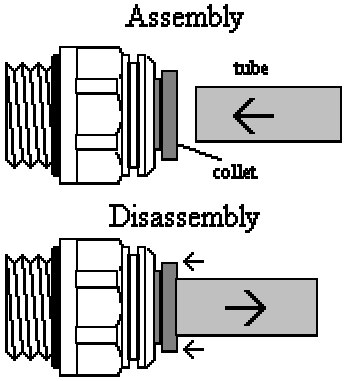
Description

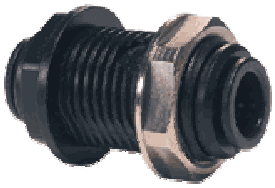
- push fit system with pressure tubes and fittings
- for aquaria, glass house tubing and air humidifier
- for air, R.O. water, sea water, tap water, food approved
- easy mounting without glue; without chemicals; connectors for other tubing (e.g. PVC) available
- pressure 0 - 10 bar (at 20 °C)
- temperature 0 - 65 °C
- resistant against diluted acids, and alkalines and sea water
- diameters 6, 10, 15, 22 mm
- easy assembling, easy disassembling, parts are re-usable, easy cleaning

Assembly / Disassembly



The pressure tube is pushed into the push fit fitting until it cannot be pushed further. The tube should be gently pulled to ensure that the connection is sound. The connection can be released by pushing back the collet and pulling the tube out.

Product Overview

Straight connector with male thread Series PM01 	Straight connector with female thread Series PM45 	Bulk connector Series PM12 
T connector Series PM02 	reduced T connector Series PM30 	Y connector Series PM23 
Straight connector Series PM04 	Reduced straight connector Series PM20 	Straight stem connector Series PM05 
Elbow connector Series PM03 	Reduced elbow connector Series PM21 	Stem reducer Series06 
Stem elbow connector Series PM22 	Hose connector with stem Series PM25 	Plug with stem Series PM08 
Plug Series PM46 	Flow bend clip Series PM26 	

Professional piping with PVC tubing

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Advantages and disanvantage of rigid PVC piping

For long-lasting piping a rigid PVC system is better than lose hose scheme. Hoses have following disadvantages:

- Hoses may slip off if they are not fixed with extra equipment like hose clamps.
- Normally soft PVC hoses are used. But they emit softeners (phthalates are similar to hormones) and after some time the hose becomes hard.
- Often too high flows are forced through too narrow hoses – energy is lost.

Temporary hose connections induce a chaotic picture. The danger of loosing track of things under the aquarium is high.

Loose hose systems are good if you rebuild your system all the time. Rigid PVC piping is only transformable with a saw. Additionally you need a little bit craftmanship to build a PVC piping.

Please notice the handling instruction of PVC cleaner and PVC glue.

A clear view of all components provides a safe transportation of water and air through the aquarium.

Dimensioning of PVC piping

As a matter of principle too small diameters causes a pressure loss that reduces the flow and wastes energy. Especially pipes that operated 24 hours per day and 365 days per year should not induce energy wasting to ensure

low running costs of the aquarium system. Normally you will not ear money with a coral reef tank – it is hobby.

Oversized pipe diameters has disadvantages, too. The invest is higher and you need more space. The larger the diameter the more sediments will settle inside of the tubing system and accumulating air may block a regular flow. The water quality gets worse and the function is not protected.

For circulation pumps – the main type for water flow in pipes in aquaristics – the maximum water velocity should be at about 1.0 metre per hour at the succion side of the pump. The pressure side is perfect with 1.5 m/s. Ideal air flows are about 10 m/s. The below table shows the piping size with its optimum water flows:

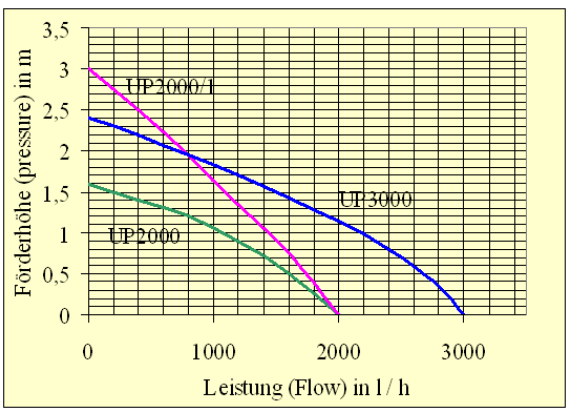
Outer diameter in mm*	10	12	16	20	25	32	40	50	63	75	90	110	125
Maximum flow in m^3/h SS	0.18	0.28	0.5	0.8	1.4	2.3	3.7	6.1	10	14	21	32	41
Maximum flow in m^3/h PS	0.27	0.42	0.8	1.2	2.0	3.4	5.5	9.1	15	21	32	47	61

Overview about the maximum flows of circulation pumps for their sucktion side (SS) and pressure side (PS). Übersicht über die maximalen Volumenströme bei Kreiselpumpen für Saug- (SS) und Druckseite (DS). Conversion from m^3/h to l/h: m^3/h * 1000 = m^3/h. For aquarium backflow pipes please look at SS.
* is for thin-walled pipes (please look at www.aquacare-shop.de); for thick-walled tubes the maximum flow is a little bit lower.

Example: you want to dimension the pipes for a circulation pump for your 500 litre aquarium to create the flow between filter tanks and aquarium. As a rough guideline take a flow of 5 times the aquarium volume per hour = 2500 l/h for this example. Look for the proximate value in the table: for the sucktion side diameter 40 mm is best and for the pressure side d32.

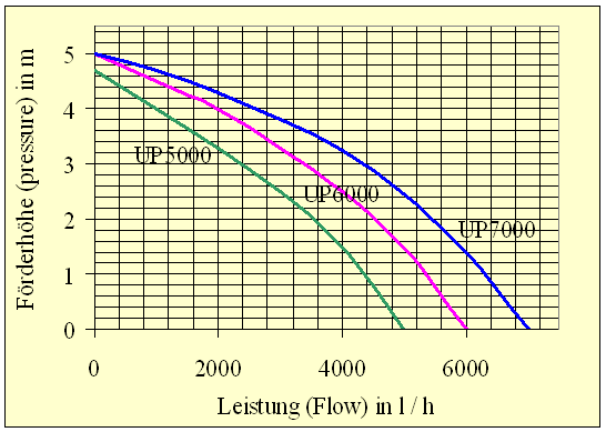
The choosen pump should reach 2.5 m^3/h (2500 l/h) at a delivery head of e.g. 1.5 m: difference between water level filter tank and water level aquarium.

Look into the characteristic diagramm of the propably right pump, e.g. aquabee UP3000.



Choose at the Y-axis the effective delivery head and go horizontally to the curve of the UP 3000. At the intersection go vertically downwards to the X-axis. The intersection at the X-axis shows the effective water flow of the pump at the delivery head of your aquarium: only 1500 l/h – the pump is a little bit too low.

Choose a stronger pump, e.g. aquabee UP 5000 and proceed in the same way.



For this example the pump would achieve 4000 l/h - more than enough. As an alternative the aquabee UP5000**e** is a choice. With the electronic adjustment you can throttle the flow down to 2500 l/h. In this examplet the energy consumption for 2500 l/h will be about 15 W compared to 75 W of the UP 5000. The higher invest is amortised after 1.4 years at energy costs of 0.23 €/kWh. Another

big advantage of the UP5000e is the lower noise emissions.

Be not confused about the connectors of the pump. The size has nearly nothing to do with the required piping size. In case of the UP5000(e) you have to enlarge the diameter at the sucking side to diameter 40 and at the pressuere side to diameter 32 mm.

Design of a PVC piping

Before you start cutting the first pipes and glueing the fittings, draw a plan with all needed tubes with their right diameter. Following points you should care to prevent mistakes:

- All tubes should be as short as possible.
- Arrange transparent pipe section in that way that you can clean them without deinstalling the whole system.
- Pipes driven only by gravitation (for example the backflow pipe aquarium to the filter tank) never show water pockets. The tubes should go downwards all the time: no uphill tubes; no communicating tubes!
- To minimize pipe resistances use for main tubes only bends instead of ellbows (alternative 2 × 45° ellbow is better than 1 × 90° ellbow), 45° T-pieces or Y-pieces instead of 90° T-pieces. The backflow pipe from aquarium to filter tank should be equipped with ellbows (cheaper, less space).
- Important units like skimmers and filters should be integrated with unions or better with ball valves. Only so a dissconncetion is easy and the maintenance is done right. Design the system in that way that you can reach all units that must be maintained. Otherwise you will not do the maintenance.
- Vibrating unit like pumps should be decoupled acoustically.
- If you use pumps with the same performance they should have the same coupling to realize a fast and easy exchange.
- Cloosed loop systems should be equipped with large intake strainers that are removable without problems.
- Calculate closed loops with a pressure loss of about 0.3 m.
- Make your plans for the future. Auxiliary connections for additional filters are useful.

PVC Fittings

You will find at http://www.aquacare-shop.de following fittings:

Change of direction:

90°-ellbow: best for backflow pipes or at very low water velocities or at shortage of space	
45°-ellbow: good for 45° changes	
90°-bends made of tubes: best for main pipes	
90°-bends, injection moulded: good for main tubes	
S-bends: perfect for offsets	
30° and 45°-bends on request	

Abzweigungen:

T-piece: suitable if the main stream goes straight ahead	

45°-T-piece: good if the main stream is divided into two equal streams	
Y-piece: best if the main stream is divided into two equal streams	
Y-Bogen: best if the main stream is divided into two equal streams	
Reduced T-piece: best if a sideline should be done	
Cross piece	

Coupling pieces:

Sleeve socket: for an inseperable connection	
Union: for a seperable connection	
Flange with flange bushing: for larger diameters	
Ball valve: for locking and seperating a connection; not very good for adjusting a flow	

3/2-(L-type) and 3/3-(T-type)way ball valves:	
Flex couplings: perfect transition of different pipe materials	
Flex couplings: vibration damping coupling between pipes	

Reducing:

Short reducer:	
Long reducer:	
Threated reducer:	
Threated double nipple:	
Screw socket:	

Transitions:

Transition sleeve: transition from tube to female thread	
Transition sleeve: Transition from tube to male thread	
Short reducer with female thread:	
T-piece with female thread:	
T-piece with male thread:	
Hose nozzel with socket: connection to hoses	
Hose nozzle with thread: connection to hoses	
Transition to Victaulic coupler:	

Transitions to push-fit fittings: simple and pressure resistant connections to hoses	
Transition to Eheim system:	

Closures:

Cap for glueing: permanent closure for tubes	
Cap with thread: for closing a male thread	
Screw plug: for closing a female thread	
Blind flange: for closing a flange connetion	
Victaulic plug:	

Miscellaneous:

Tank adaptor: if tubes should go through an aquarium glass (backflow from aquaria)	

Tank adapter with flat runout: for completely empying an aquarium	
Tank adaptor with squeeze adaptor: you can disassemble the tube	
Slot pipe with cap: usable as an intake screen	
Threaded pipe:	
Octagonal nut:	

Important armatures

Um den Wasserstrom einstellen zu können gibt es unterschiedliche Armaturen.

Check valve (spring loaded): avoids backflowing water	
Check valve, wafer type: avoids backflowing water	
Slanted seat valve: for exact adjusting a flow	
Membrane valves: for exact adjusting the water flow	
Dosing ball valve: for exact adjusting of small water flows	
Adaptor for measuring chains: suitable connector for 12 mm probes (pH, ORP)	

Handling of PVC pipes

1. Check if the PVC tube easily fits to the fitting. If the connection is too tight grind the fitting and/or the tube with sand paper to ensure mobility.
2. Work only in a good ventilated room.
   Cleaner and glue are inflammable and are more heavy than air.
   Do not smoke - do not weld - prevent spark formation and electrostatic charge - no open light and fire.
   Do not inhale - keep used cleaning paper in closed boxes - wear protective gloves - keep away from children.
3. Cut the tubes rectangular and bevele and trim the ends.
4. Clean the surfaces of fitting and tube with PVC cleaner. Therefore put a little bit of the cleaner onto a paper towel and wipe the places for glueing carefully. Fat and dust has to be removed totally.
5. Coat the glue on both glueing places - first in the fitting, secondly onto the tube. For tubes larger than 40 mm (1.25") choose a larger container with application brush. The following bonding should be done without delay. Diameters larger than 90 mm (3") should be executed with two persons to reduce the open time of the glue.

6. Push the tube totally into the fitting without torsion or twist. A correction is - if even possible - only feasible for a very short time depending on the tolerance of fitting and tube.
7. Wipe away surplus glue with a paper towl.
8. After about 2 hours at room temperature you may startup the operation (pressure-less). After 24 hours at room temperature the full maximum pressure is achievable. Lower temperatures extend the curing time.
9. Flush the pipework before using.

Care and Breed

- useful accessories -

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Aiptasia-Ex: a set with mixing container, syringe with drain tube, calcium hydroxide powder and manual. order number: EX-001

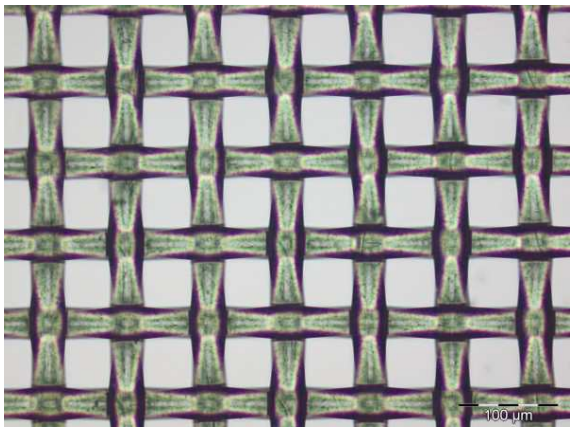
Aiptasia-Ex

Set for exterminating *Aiptasia*, anemones, sponges, button polyps, mushroom polyps and other unwanted animals

Invertebrates like anemones, sponges, button polyps and mushroom polyps are welcome if they occur as single animal or in small groups. But it is possible that they proliferate to large carpets that overgrow or nettles other animals. From aquarium to aquarium different invaders can attack. The most unwanted animals are: *Aiptasia*, *Anemonia* cf. *ma(n)jano*, *Collospongia auris*, *Zoanthus* spec. *Discosoma* spec., *Rhodactis* spec.. All these animals are very beautiful but if they overgrow the half aquarium you will hate them like poison.

It is very important that you act before the half aquarium is occupied by the invaders. The battle against them is long-winded and complicated - and if you fight to quickly against them the whole life in your aquarium is threatened.

Large plankton screens from 6 to 2000 µm



Plankton sieves are used normally for plankton breeding. The sample to be screened should be poured carefully through the screen: all particles and organisms large than the filtration size are hold back, the water and smaller particles will flow through. The AquaCare screens have a large diameter (100 or 200 mm) to uptake big volumes. The screen body is made of PMMA (perspex), the web of PA (polyamide) - so the product is fully usable for sea water.

Order number	Fineness	open area	Order number	Fineness	open area
Sieb200(100)/006/5	6 µm	5%	Sieb200(100)/150/41	150 µm	51%
Sieb200(100)/015/10	15 µm	10%	Sieb200(100)/200/54	200 µm	54%
Sieb200(100)/025/19	25 µm	19%	Sieb200(100)/500/47	500 µm	47%
Sieb200(100)/050/37	50 µm	37%	Sieb200(100)/1000/57	1000 µm	57%
Sieb200(100)/100/49	100 µm	49%	Sieb200(100)/2000/57	2000 µm	57%

Disinfection system

There are some application cases that needs a careful disinfection. If other methods like heating (pasteurizing, autoclaving), irradiating with energy-rich electromagnetic waves (gamma rays, X-rays) or UV light are not suitable or to dangerous the chemical disinfection is the only choice.

The AquaCare disinfecting solution is working with the chlorine dioxide method - do not mix up with chlorine gas or hypo-chloride method! Chlorine dioxide has the distinction of killing steady algae, bacteria, viruses, spores, fungi and protozoa. Chlorine dioxide has a 2.5 time larger oxidation power than per-acetic acid, hydrogen peroxide, sodium hypochlorite or gaseous chlorine. It is much more faster reacting than chlorine and is suitable in a wide pH range of 6.5 and 9.5. The deposit effect enables this chemical to destroy biofilm. Odorants like phenols and algae decomposition products will be oxidized. In contrast to the chlorine method the chlorine dioxide methods do not form halogenated substances like THM, chlorine phenols, AOX, chlorine amines: no reaction with primary, secondary and quaternary amines.

Set for producing 400 liters of disinfection solution consisting of:
2 × fuid component,
2 × powder component,
5 ml-Syringe,
order numer EX-002

The AquaCare disinfection solution is suitabel for aquaria, container for breeding micro-algae or plankton, for defrosting of frozen food, for steady disinfection and for membrane disinfection.

Plankton tube

You can use the AquaCare plankton tube for breeding phytoplankton (in combination with light; best are T5 fluorescence lamps) and zooplankton. The large netto volume of 4 liters enables a fast growth of the organisms. The system is airtight (phytoplankton tube); for disinfecting it you may use e.g. chlorine dixoide.

The phytoplankton tube consists of a acrylic cylinder with a conical bottom and a closure. There are two connectors (4 mm nozzles) for aerating and de-aerating the culture. Two brackets for wall mounting are in the scope of delivery.

The zooplankton tube includes two additional connectors and a paddle scraper made of stainless steel. Detritus and other sediments are removed to suck away with a hose.

spare parts of the head

complete zooplankton head

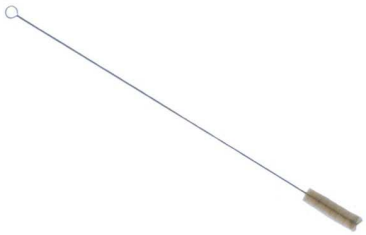
acrylic cylinder with cone and paddle scraper

zooplankton tube with adult *Artemia „salina*“, fed with the diatom *Phaeodactylum tricornutum*

Order number phytoplankton tube: Pkt90-90
Order number zooplankton tube: Pkt90-90z
Diameter: 90 mm
Volume total / netto: 4.6 / 4.0 Liter
Height / required space: 905 / 950 mm (others are possible)
Materials: PMMA (acrylic glass), ABS, O-ring made of NBR, PA-fittings, special stainless steel

extra thick silicone hose 4/7 mm; best for reactors and plankton tubes;
order number (per meter): 893-005

Hydrophibic sterile filter for aeration of plankton tubes with 0.45 µm pores and extra large surface (16 cm^2), rejection of 99.97% of all particles > 0,3 µm; connection nozzles for 6-10 mm hoses; membrane made of PTFE, housing made of PP. The filter should be protected against large particles (dust).
Order number: EX-003



Extra large cleaning brush e.g. for plankton tubes
Diameter: 30 mm
Border length: 125 mm
Total length: 900 mm
Order number: Brst-001

Cultures and media for plankton breeding

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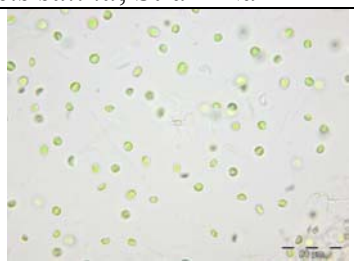
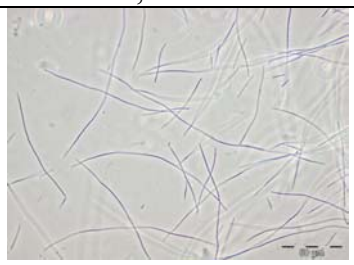
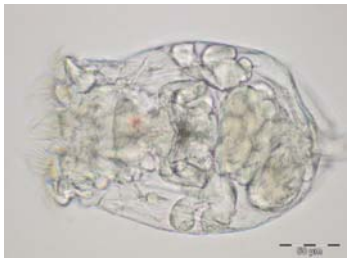
Algae cultures

The cultures of AquaCare are delivered in 1 liter flasks. There is a high purity level (microscopic control), but we cannot guarantee axenic culture (free of any other organisms). The transport (within Germany) take place only Wednesdays and not at very hot weather. Detailed information are only available in the internet.
The cultures are not available all the time.

Nannochloropsis salina, Strain Nan-4			
		Cell lenght: 2...5 µm Cell wide: 70...100% of cell lenght Order number 1 litre: klt-nan4-010	*Nannochloropsis salina* is an extreme small micro algae for feeding very small to larger zooplankton organisms. It is very rigid and prevails easily in mixed cultures at non optimal conditions. Ideal for beginners. Medium: algae medium 14:1
Unkown cyanobacterium, Strain Xxx-8			
		Cell lenght: 5...500 µm Cell wide: < 1 µm Order number 1 litre: klt-xxx8-010	This unkown cyanobacterium is very fast growing species for feeding small to large zooplankton organisms. Ideal for beginners. Attention: it is overgrowing slowly growing algae cultures. Medium: algae medium 10:1
Phaeodactylum tricornutum, Strain Pha-7			
		Cell lenght: 25 µm Cell wide: 2.5 µm Order number 1 litre: klt-pha7-010	Pennate diatom; easy to grow. It should be fed only indirect (e.g. with *Brachionus*) to larvae. Medium: algae medium 7:1

Zooplankton cultures

Brachionus plicatilis L-type, Strain Bra-9			
		Animal lenght: 200...400 µm Animal wide: ca. 50...75% of length Order number 1 litre: klt-bra9-010 approx. 250 / ml	Ideal "transport container" for nutrients for feeding small and medium larvae. The nutrient concentration of *Brachionus* is very low, but it is possible to enrich these rotators very easily. Therefore a high-grade nutrient concentrate and/or fresh micro algae have to be fed. After it *Brachionus* should be used.

Breeding media (concentrates)

Breeding media of AquaCare are designed exactly for the needs of the different algae. To prevent bacterial growth only mineral substances are used as far as possible. The pH of the ready solution is not influenced. To validate if the medium contains still enough nutrients the nitrate concentration should be controlled regularly by test sticks. If nitrate is diminished the phosphate concentration is low, too. The finished algae culture is ready for use in the next plankton level without cleaning of centrifugating. The direct feeding to zooplankton (if they need phytoplankton) is possible, too. Phosphate and nitrate concentrations are below harmful concentration all the time. Eutrophication or undesirabel development are expelled.

Different species of algae have very different needs of nitrogen and phosphorous - the N:P ratio may differ extremely from the so-called REDFIELD ratio. AquaCare has optimized the media to the cultivated algae species to make sure that after the breeding time both nutrients N and P are nearly consumed. If you want to cultivate an algae with unkown requirements choose the medium with a N:P ratio of about 16:1. To create any N-P ratio you can use the N- and P-additives.

	**1 litre lasts for:** 10,000 litres 1fold Medium 1,000 litres 10fold Medium 100 litres 100fold Medium contains 16 trace elements, nitrogen and phosphorous	
N:P = 16:1	Order number 1 litre: klt-16-010	
N:P = 14:1	Order number 1 litre: klt-14-010	e.g. for *Nannochloropsis salina,*
N:P = 10:1	Order number 1 litre: klt-10-010	e.g. for xxx-8 (unkown cyanobacterium)
N:P = 7:1	Order number 1 litre: klt-07-010	e.g. for *Phaeodactylum tricornutum,*
N-additive	Order number 1 litre: klt-N-010	for mixing any N-P ratio: contains 23.5 g N/l (1.685 M) resp. 3.3 g P/l (0.1053 M) at dosing 1 ml per litre yields 104 mg/l nitrate resp. 10 mg/l phosphate in the ready algae medium
P-additive	Order number 1 litre: klt-P-010	

CoralTray

the perfect basis for coral fragments

AquaCare GmbH & Co. KG
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To propagate coral fragments, you will need the appropriate mother animals, growth bodies with the suitable adhesive and a little space for the new offshoots. An extra tank is not always available, so that a little space must be created for the new corals in the main aquarium.

CoralTray is a system that can be enlarged to almost any size. It can be mounted on panes in the main, side tank or illuminated filter tank or alternatively placed on the floor. Assembly is done either by a magnet system or by screwing together using connector plates. The system is so flexible that a coral fragment level can even be created around a overflow chamber. Most commercially available growing bodies made of plastic or mineral substances fit into the holes. *CoralTray* can even be equipped with the usual light grid plates. The AquaCare base is made of high-quality acrylic glass, corrosion-resistant PA screws and embedded neodymium high-performance magnets.

Magnetic holder with *CoralTray* plate 170 x 85

Magnetic holder with light grid plate

Growth support with mineral surface

Applications of the growth support

professional grid system made of glass fibre reinforced plastic (GRP)

Technical data of *CoralTray* elements:

Size of *CoralTray* plates	**170 × 85**	**170 × 170**	**Corner 170**	**340 × 170**
Picture				
Order number	CT170-85	CT170-170	CTC170	CT340-170
Lenght × wide in mm	170 × 85	170 × 170	170 × 170	340 × 170
Thickness of the plates	5 mm in **transparent** or fluorescence **Red** (order number CTxxx-xxxR)			
Numbers of holes*	28	61	36	127
Diameter of holes	12.5 mm			
Magnetic holder (1 pair)**		Order number: CT-MH; size: 150 × 25 × 15 mm Material: Acrylic glass, transparent, high-performance neodymium magnets, polyamide screws M6×20		
Connector plate (1 Set)		Order number: CT-VP; size: 53 × 53 × 10 mm Material: Acrylic glass, transparent, polyamide screws M6×20		
Light grid panels		Order number: CT-LRP; size: 60 × 60 cm Material: polystyrene, black		
Feet (1 set = 4 pieces)		Order number: CT-F; lenght: 45 mm number of feet: 4; suitable PA screws and washers for fragment plates and grid plates		
Growth support for larger coral fragments		Order number: CT-plug1 suitable for *CoralTray*, most light grid panels, also for professional grids in GRP, can also be placed on the floor without mounting system		
Coral glue for hard fragments		Order number 280 ml: RE18111 Order number 1000 ml: RE18222 Low-temperature hot-melt adhesive for fixing mainly hard coral fragments		
Coral glue for soft and hard fragments		Order number 20 g: RE26772 thick coral adhesive based on cyanoacrylate for soft and hard corals		

* 6 holes can no longer be used when installing a magnetic holder; additional spaces are created when joining with connector plates.

** Attention: Strong magnets! Cardiac pacemakers: Magnets can influence the function of pacemakers and implanted defibrillators. Risk of crushing if used improperly.

Keep out of the reach of children! Danger of swallowing small parts.