

# GRIFAID®

FAMILY Aquafilter

## TECHNICAL DATA PROPERTIES

### Flow rate:

90 litres per hour<sub>1</sub>

### Ultrafiltration filter capacity:

100,000 litres

### Operating Life:

> 5 years<sub>2</sub>

### Bacteria retention:

> 99,99999% (log 7)

### Virus retention :

> 99,999 (log 5)

### MWCO:

150,000 Daltons (equivalent to 0.01 Microns)

### US compliance:

EPA-US National Primary Drinking Water Regulations under the Safe Water Drinking Water Act 93-523

### Dry Weight:

1.2 kg

### Dimensions of packaged system:

Height: 480mm

Width: 100mm

Depth: 140mm

### Units per pallet 143cm x 120cm x 100cm (inc. pallet):

200

### Warranty:

1 year international limited

### To Operate

1. Collect water in a bucket or any available vessel
2. Place the Aquafilter in the water. Clamp to the container
3. Pump for safe drinking water



## CLEANING PROCEDURES

### Mesh Screen cleaning

A large 120 micron mesh prevents large particles, such as sand entering the membrane.

### Built-in cleaning system

A two way cross flow continually washes the membrane while pumping.

### Built-in flushing system

Contaminants which have been filtered out are removed safely from the filter by opening an outlet stopper and pumping.

### Backwashing syringe

Allow to backwash if particles in the membrane pores have not been removed by the cross flow

### Chemical cleaning

A pot of chemical cleaning tablets is stored in the filter for use in case membrane pores are blocked with bio film.

## MAINTENANCE PROCEDURES

### Grease reservoir

A reservoir of silicon grease is stored in the filter to apply to the pump piston seal, to make the pump continue to be easy to operate.

### Spare seals

Spare piston seals are stored in the piston handle to replace a worn seal and extend the life of the filter.

**For more information about our Aquafilters, how to order or donate, log on to [www.grifaid.org](http://www.grifaid.org) or contact us on the details below:**

Grifaid, 16 Burdon Road, Cleadon,  
Sunderland, SR6 7RU

email: [info@grifaid.org](mailto:info@grifaid.org)

Tel: +44 (0) 191 536 3851

<sub>1</sub> Flow rate depends on the feed water quality

<sub>2</sub> Depends on the maintenance and the feed water quality

# GRIFAID<sup>®</sup>

COMMUNITY Aquafilter

## TECHNICAL DATA PROPERTIES

### Flow rate:

Flow rate: 300 litres per hour<sub>1</sub>

### Ultrafiltration filter capacity:

1,000,000 litres

### Operating Life:

> 5 years<sub>2</sub>

### Bacteria retention:

> 99,99999% (log 7)

### Virus retention :

> 99,999 (log 5)

### MWCO:

150,000 Daltons (equivalent to 0.01 Microns)

### US compliance:

EPA-US National Primary Drinking Water Regulations under the Safe Water Drinking Water Act 93-523

### Dry Weight:

12 kg

### Dimensions of packaged system:

Height: 480mm

Width: 250mm

Depth: 250mm

### Units per pallet 143cm x 120cm x 100cm (inc. pallet):

20

### Warranty:

1 year international limited



### To Operate

1. Collect water in any available water vessel
2. Place the foot strainer in the water
3. Pump for safe drinking water

## CLEANING PROCEDURES

### Mesh Screen cleaning

A large 120 micron mesh prevents large particles, such as sand entering the membrane.

### Built-in cleaning system

A two way cross flow continually washes the membrane while pumping.

### Built-in flushing system

Contaminants which have been filtered out are removed safely from the filter by opening an outlet stopper and pumping.

### Built-in backwashing system

Valves allow to backwash if particles in the membrane pores have not been removed by the cross flow.

### Chemical cleaning

A pot of chemical cleaning tablets is stored in the filter for use in case membrane pores are blocked with bio film.

## MAINTENANCE PROCEDURES

### Grease reservoir

A reservoir of silicon grease is stored in the filter to apply to the pump piston seal, to make the pump continue to be easy to operate.

### Spare seals

Spare piston seals are stored in the piston to replace a worn seal and extend the life of the filter.

<sub>1</sub> Flow rate depends on the feed water quality

<sub>2</sub> Depends on the maintenance and the feed water quality

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## SAFETY NOTICES & TESTING

### SAFETY NOTICES

1. Grifaid Aquafilters remove biological contaminants. They DO NOT remove dissolved minerals such as salt from sea water, arsenic from bore holes. If you wish to filter water from a bore hole, find out what it is contaminated with before going ahead with a solution.
2. The membranes which do the filtering can be damaged by too much heat, or excessive mechanical shock. DO NOT leave a filter for long periods in direct sun light, and although it is robust, treat it with reasonable care.
3. If the clean water keeps coming out cloudy it means the membrane is damaged. STOP USING the filter, and tell your supplier. You can also check the filter is undamaged with a bubble test, which is described in the instructions.

### TESTING

Laboratory Tests for Microbial Reduction. The University of Arizona tested two Grifaid Family Aquafilters to the USEPA recommendations. The results were bacteria retentions of log 6 to 8.23 (USEPA guidelines are log 6), and virus retention log 4.9 to 5.75 (USEPA guidelines are log 4). See the University of Arizona test report.

### Newcastle University

The University tested the Grifaid Community Aquafilter. Results showed a bacteria retention of log 9. See the Newcastle University test report.

The filtration in the Grifaid Community Aquafilter and Grifaid Family Aquafilter is carried out with identical membrane hollow fibres from the same manufacturer.

Tests for bacteria removal have also been carried out by:

- The Rwanda Standards Bureau
- The Kenya Water Institute
- The Water Quality and Control Laboratory, The Gambia.

and approved for use in the country.

### Field Tests

Grifaid Family Aquafilters & Grifaid Community Aquafilters have been in use in two sites in The Gambia for up to four years.

Their performance has been periodically monitored and after inspecting them in June 2013, it was concluded that:

“Filters have lasted at least four years with no sign of coming to the end of their working life. On the basis of these results it is predicted that they should last at least 5 years. Continued evidence may extend this prediction.”

### Test on the effectiveness of Cleaning Procedures

Tests were conducted at Newcastle University on a Grifaid Family Aquafilter to test the effectiveness of cleaning procedures. This was done in two stages:

1. The feed water was dosed with mud, and the filter operated automatically until it became clogged.  
Cleaning procedures produced 100% recovery in flow rate.
2. The feed water was dosed with live yeast to replicate biological contaminants, and the filter was operated automatically until it became clogged.  
The cleaning procedure achieved an 80% recovery.

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## FAMILY Aquafilter

## HOW THEY ARE DESIGNED

GRIFAID Water filters were designed at the outset to be suitable for use in developing countries. The design objectives were to make them:

- Affordable, by good design with plastic mouldings.
- Long lasting, without the need for consumable elements, by the incorporation of continuous cross flow in the fibres, back flushing and washing systems.
- Easy to use, with flow rates to supply water on demand.
- Portable, so they can be carried to the place of use, and also securely stored when not in use.
- Useable anywhere, without the need of a supply of electricity.

The design of GRIFAID Water filters has been inspired by public water facilities design. In advanced countries Ultrafiltration membranes have been used in water treatment plants for years. To avoid clogging they are frequently back washed and occasionally chemically cleaned. GRIFAID Water ultrafiltration membranes have the exact same technical specification, and the filters incorporate the same cleaning regimes. This allows people deprived of clean drinking water to access sterile water by the same technology.

In selecting the type of membrane for filtration we had to choose between microfiltration, which has a high flow rate, but only removes bacteria, and ultrafiltration which has only a quarter of the flow rate, but also removes viruses. We could not be satisfied with either poor flow or the ability to produce safe drinking water from the source of feed water, so we simply decided to design larger capacity ultrafiltration membranes into our GRIFAID Water filters.

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# GRIFAID®

## COMMUNITY Aquafilter

## HOW THEY WORK

### Filtration and Cleaning



A cut-away section showing the filter straws - these are filled with tiny holes helping to filter out impurities found in even the dirtiest water

The ultrafiltration membrane removes bacteria and viruses from the water. It consists of small tubes, which have leaky walls that allow water to pass through, but hold back dirt, bacteria and viruses. The water leaks through holes in the walls (called pores) which are 0.00001 millimetre in diameter.

This dot . is about 1 millimetre square, so 10 000 000 000 such holes could fit inside it!

The filtration is purely mechanical, no chemical treatment is used, and it can be used for many years because the filtration surfaces are being continually washed. This cleaning has several stages, and the number of stages required depends on the condition of the water to be treated. The stages are:

1. Continuous washing. On the down stroke of the pump the dirty water flows up the tubes into the space above them, and on the up stroke the water flows back down the tubes.
2. The contaminants which are removed from the water stay in the filter, and are periodically flushed out.
3. In exceptional cases contaminants can block the pores. These are removed by back flushing, which involves forcing clean water back through the pores.
4. In rare cases it is possible that biological growth can occur in the membrane tubes from the feed water, and this can block up the pores. This is cleared by chemical washing with tablets supplied with each filter.

This unique combination of features enables the filters to cope with a range of biologically contaminated waters for many years.

### Mechanical Life

The single mechanical part that wears with use is the pump seal.

This can be re-greased to prolong its life from a grease pot attached to the filter. The seal can also be replaced without tools and spare seals are attached to the filter.



# GRIFAID<sup>®</sup>

## FAMILY Aquafilter

# USER MANUAL

## WHAT IT DOES

The Aquafilter removes germs from water to make it safe to drink. It is suitable for cleaning water from shallow wells, rivers, ponds and lakes.

The Aquafilter does not remove dissolved minerals, such as calcium or arsenic sometimes found in deep wells. Water from deep wells which needs treatment should be tested to find out what is needed. The Aquafilter does not remove salt from sea water.

## HOW IT WORKS

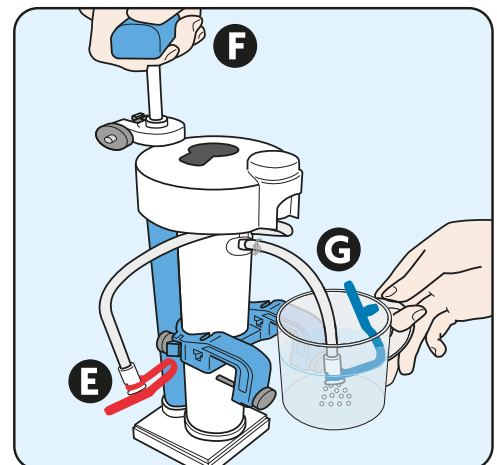
Very small holes (0.00001 millimetres in size) in the main filter hold back germs, but allow water to pass through. This makes the water good for drinking without the need to add chlorine or other chemicals. The dirty water first passes through a separate mesh and is then pumped through the main filter. As clean water is pumped out, some dirt may get stuck and need washing out with the small water pump supplied. If dirt is still stuck in the holes, it can be washed by the tablets supplied.

## ! SAFETY

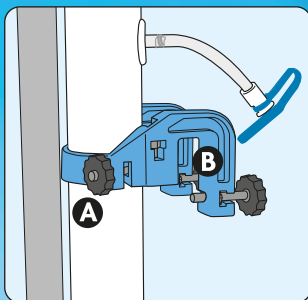
1. Never drink water coming from pipe with the red stopper.
2. Empty dirty water in the bottom of the box or bucket at least once a week.
3. Do not store the Aquafilter in sunlight.
4. To check drinking water is clean:
  - Take filter out of water.
  - Close red stopper (E), open blue stopper (G).
  - Put outlet pipe into a mug of clean water.
  - Pump the handle (F).

If bubbles keep coming out of the outlet pipe, it may be faulty.

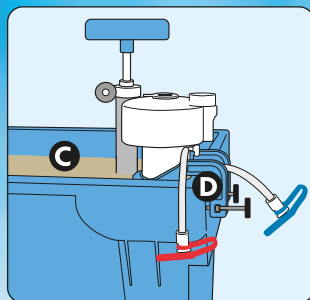
**STOP USING IT AND CONTACT YOUR SUPPLIER.**



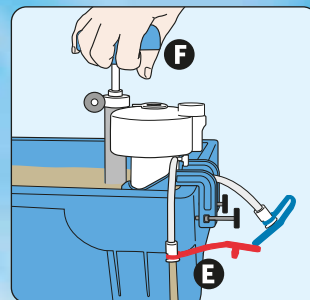
## TO GET CLEAN WATER



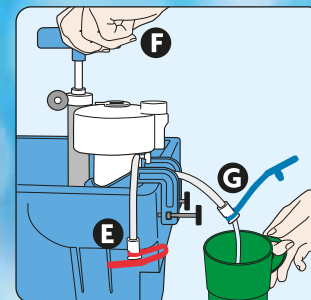
1. Loosen knob (A). Move bracket (B) to fit filter in box or bucket. Tighten knob (A).



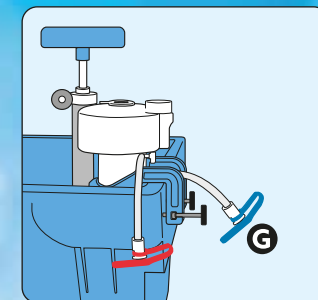
2. Fill box with water (C). Fasten on filter (D).



3. Open dirty water outlet (red stopper) (E). Pump 10 times (F). Repeat everyday.



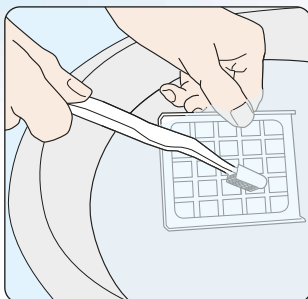
4. Close red stopper (E). Open blue stopper (G). Pump (F) to get clean water out of pipe (G).



5. Close blue stopper after use (G).

## TO CLEAN THE MESH FILTER

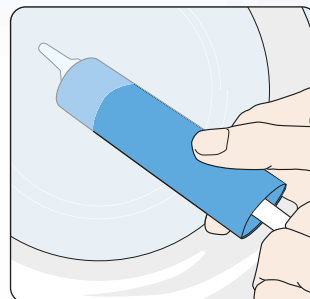
- If the water flow reduces



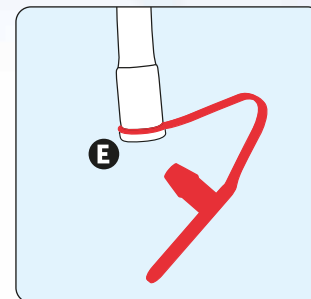
1. Remove the mesh and wash in clean water.

## TO BACK FLUSH

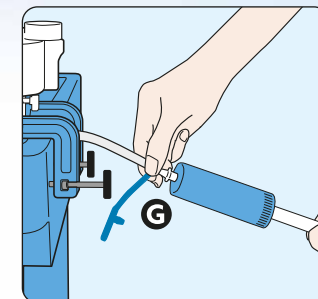
- If the water flow is no better



1. Fill water pump with clean water.



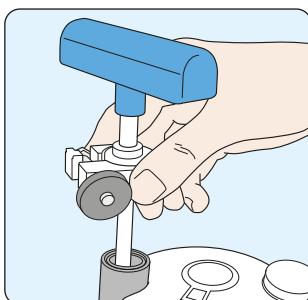
2. Open red stopper (E).



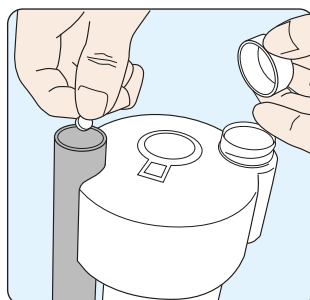
3. Pump water through outlet pipe (G) with water pump. Repeat 5 times.

## TO CLEAN WITH TABLET

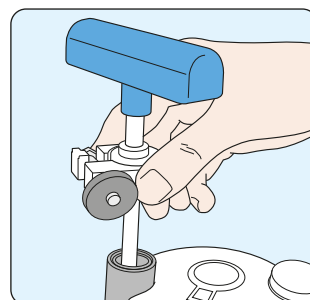
- If flow is still no better



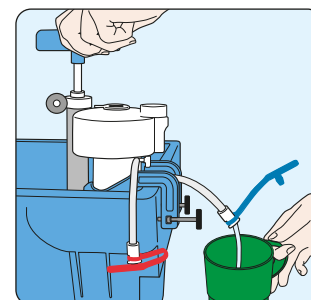
1. Remove the pump. To be done in the evening.



2. Take a tablet from the pot, drop in the hole. Leave for 15 minutes.



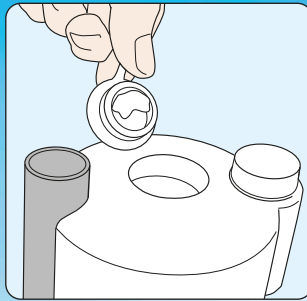
3. Replace the pump. Close the red stopper, pump 5 times. Leave for one night.



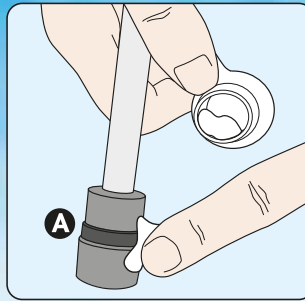
4. Next Morning: Pump for clean water. Throw away the first 2 cups. Then use.

## TO GREASE THE PISTON SEAL

- If pumping  
becomes hard

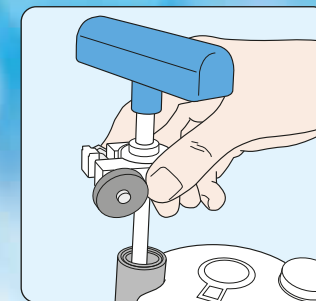


1. Open the grease pot.

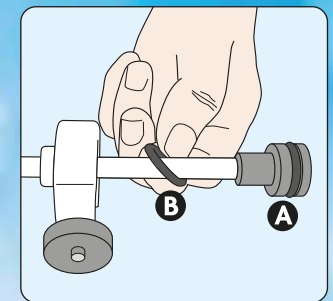


2. Wipe grease onto the  
piston ring (A).

## TO REPLACE A PISTON SEAL - If the pump leaks



1. Remove the pump.



2. Pull off the old ring (A).  
Replace with the new one  
on the rod (B).

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# GRIFAID<sup>®</sup>

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# USER GUIDE



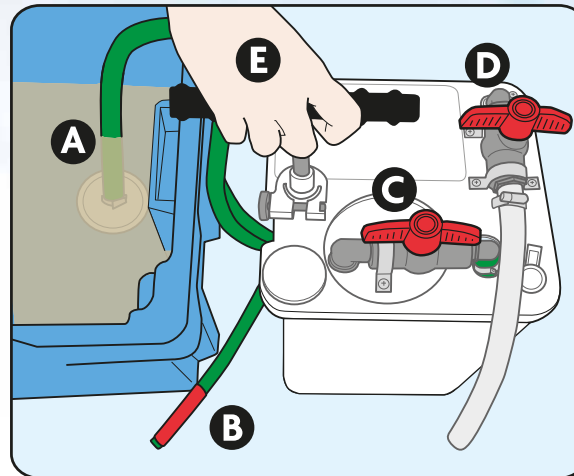
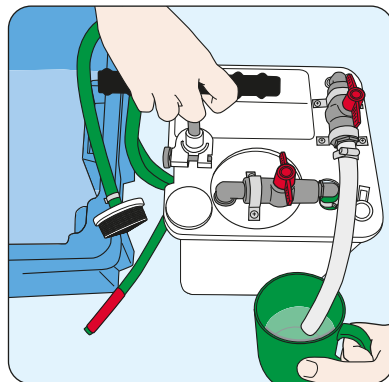
## SAFETY

1. **NEVER** drink water from pipe with the red stopper.
2. Empty dirty water in the bottom of the box or bucket once a week.
3. **DO NOT** store in sunlight. The heat could damage the filter.
4. **CHECK** water is clean-

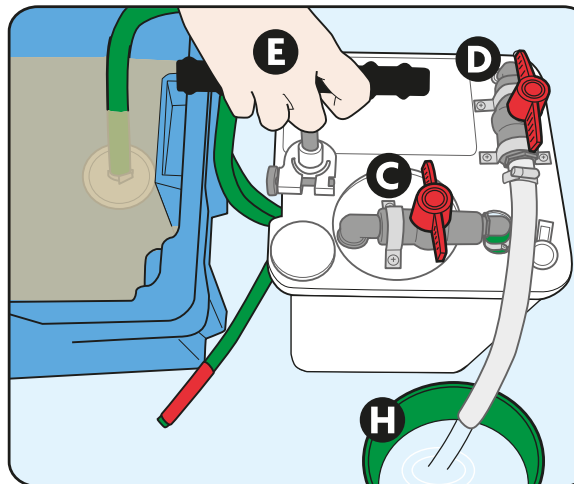
- Take inlet out of dirty water.
- Turn taps as shown.
- Put outlet pipe into a mug of clean water.
- Pump.
- If bubbles keep coming out of the outlet pipe,

**THE FILTER MAY BE FAULTY.**

**STOP USING IT AND CONTACT YOUR SUPPLIER.**



1. • Inlet pipe (A) in dirty water box.  
• Red ended pipe (B) outside the box.  
• Taps (C), (D) as shown above.  
• Pump (E) until water comes out of red ended hose (B).

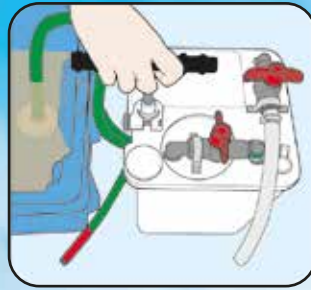


2. • Turn taps (C), (D) as shown above.  
• Pump (E) for clean water (H).
3. • After use, turn tap (D) to its original position to close.

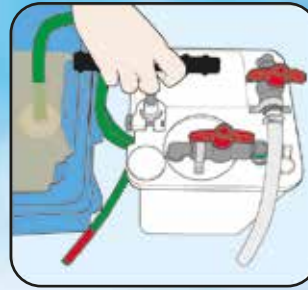


## BACK FLUSH

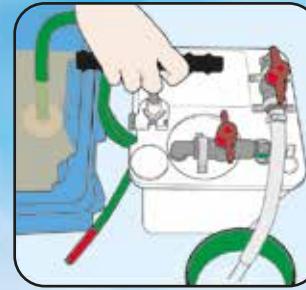
IF WATER  
FLOW  
REDUCES



1. Turn **red taps** as shown.  
Pump 4 times.



2. Turn **red taps** as shown.  
Pump 8 times.



3. Turn **red taps** as shown.  
Pump clean water.

4. If water flow is still low  
repeat 1, 2 and 3.

## CLEAN THE INLET PIPE AND PRE-FILTER

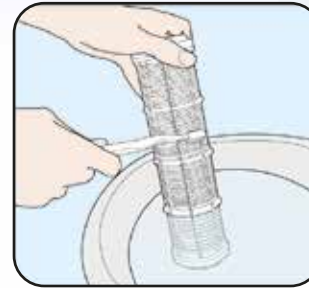
IF WATER  
FLOW IS  
NO BETTER



5. Clean the inlet pipe.



6. Unscrew the  
pre-filter housing.



7. Clean the mesh  
pre-filter housing.



8. Replace the housing.

## CHEMICALLY WASH - IN THE EVENING

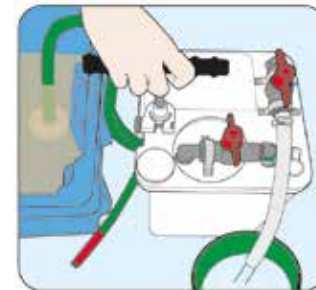
IF WATER  
FLOW IS  
STILL NO  
BETTER



9. Unscrew the pre-filter.



10. Take the 5 tablets from  
the pill pot. Put in the  
pre-filter. Wait 10 minutes.  
Then replace the housing.



11. Turn **red taps** as shown.  
Pump 10 times.

12. Leave filter overnight  
and clean water