

drinkWater



PROVITEC®

## THE drinkWater FILTER PROaqua 4200

*We are living on the Blue Planet. For all of us, plants, animals and humans alike, indeed for every organism in the world, water plays a key role. However, only a very small part of the planet's water reserves is available as drinking water 0.3%. Compared with the reserves of the whole world, this is very little, but nevertheless, this tiny part is under threat. Scientists are concerned about the increasing contamination of our drinking water resources. Our environment demands a radical change of attitude on our behalf.*

*Clean, contaminant-free drinking water is becoming scarcer all the time. Sewage water from industries, hospitals and agriculture is loaded with chemicals, while household wastewater is full of cleaning agents, and poisonous substances from special refuse dumps are infiltrating into the ground. Therefore, it is becoming more and more difficult for water works, and particularly singlehouse supply systems fed by their own wells, to meet the legal standards.*

*However, health risks due to water contamina-*



*tion are still insufficiently researched and only a few reactions are known, like those caused by: Nitrate, nitrite, organic compounds (i. e. pesticides), "pseudohormones", residues of drugs and antibiotics, lead, copper, cadmium, chlorine, uranium etc. Some are considered carcinogenic, some may cause genetic defects, or infertility, malfunctions of the nervous system or brain, may harm bones and skeleton, produce studying and concentration problems or even lead to the death of babies as in the case of nitrite. However, even if the limits are met, there are still no studies available about the accumulation effects of the substances or about the chemical compounds created in the human body.*

*Scientists warn against new pathogenic bacteria, which are multiplying rapidly into resistant bacteria and microorganisms due to the ever-increasing usage of antibiotics in human and veterinary medicine. Scientists are also worried about the resistance of bacteria, viruses and parasites (cryptosporidium etc.) to the typical chemicals (chloride, ozone) or the UV-radiation used for water treatment.*

### YOUR BENEFITS:



**best water quality  
directly from your water tap**



**Better-Tasting and Better-Smelling Drinking Water and for cooking**



**Help the environment**



**Better for Health**



**no more pet bottle pollution**



**Living Water.  
Water crystal by  
Dr. Masaru Emoto**

## SELF-PROTECTION OF WATER QUALITY WITHOUT CONTAMINATION

Almost all foods are prepared or cooked with water. Vegetables and fruit are washed, while we use water for coffee and tea. Part of our "drinking" water is used after boiling, but some chemical substances and contaminants cannot be eliminated this way and, along with the food, they easily find their way into our bodies. On average, a 60-year-old has consumed about 55,000 litres of water during his lifetime. Considering these quantities, it is only logical

that we are demanding healthy, uncontaminated water.

Of course, only an ecological way of dealing with Nature is the long-term answer to such a calamity. However, if we want to be sure now and not only in the future that we are not putting our health at risk even further, it seems that we need to take our own initiatives for reliable drinking water treatment.

### REQUIREMENTS FOR OPTIMAL WATER FILTRATION:



**no power**  
necessary



**no wastewater**  
only for regeneration  
(every 2-3 months)



**no chemical waste**  
only salt  
for regeneration

#### removes harmful substances, e.g.:

- radioactive substances
- agricultural pesticides
- hormones
- heavy metals, uranium
- „limescale“
- Nitrate, nitrite
- dissolver
- residues of pharmaceuticals
- bacteria, parasites, viruses
- and a lot more.

#### Amongst others, it was examined and tested by:

Stiftung Warentest (Product Testing Foundation) (Test in January 2001)

Bavarian Ministry for Health and Consumer Protection

Institute Max-von-Pettenkofer for Clinical Virology

Bavarian Healthcare Institute

ESWE-Institute GmbH

Industrial Institute Bavaria / State Office for Public Health

**Excellent results**



**PROVITEC®**

## APPLICATION OF THE PROaqua 4200 - THE MULTI BARRIER SYSTEM -



Since everyday drinking and cooking water is usually tapped only in the kitchen, the PROaqua 4200 has been designed to fit under the kitchen sink.

Thus, clean, contamination free, microbiologically impeccable water with a pleasant taste is always available for the user from a separate tap, (fig.1) or from a special design faucet with separate outlet function for filtered water. (fig.2)

However, the filter can be installed completely individually, even before and after machines and appliances, where a flow rate of approx. 2.5 l/min is sufficient (industrial design 4.5 l/min), but where uncontaminated, softened or partially softened water is required.

### Physical bases of the filter technology



Because of the different possible combinations of filter mechanisms and techniques, more than 100 different configurations enable the elimination of almost all known water contamination. Therefore, the PROaqua 4200 drinking water filter can be customized for any existing requirements or contamination problems.

The optimum physical water flow conditions through the different filter materials and mechanisms avoid any dynamic currents achieving maximum filtration quality and performance. The flow rate in the filter materials and mechanisms is very low and does not exceed approx. 3 mm/sec.

### Technical description



The raw water flows through the connection kit (main valve, pressure reduction valve, regeneration valve) and the red inlet hose into the bottom of the filter casing.

The pressure regulation system limits the water inlet to max. 2.5 l/min (industrial model 4.5 l/min).

In the first filter level, the water runs through the gravel bed filter, where a gravel layer retains suspended particles and sediments. This is when the filtration proper starts in the different cartridges adjusted to the respective water contamination. The cartridges are cylindrical containers made of PP plastic and equipped with a permeable plastic grid on the top and bottom.

“Rinsing” of the filter mechanisms inside the cartridges is avoided by filter fleeces made of polypropylene needled felt, 200µ. The volume changes of the filter mechanisms are also balanced by filter fleeces. After complete filtration of all the chemical substances in the different filter cartridges, the water flows through a specially prepared medical membrane filter, which retains and eliminates completely all bacteria, parasites and microorganisms.

The filtration stage is now finished. Now the chemically and microbiologically impeccable drinking water can flow through the outlet hose to the tap or outlet fittings.

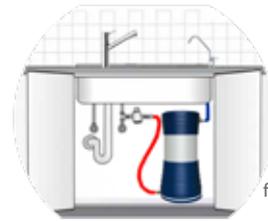


fig. 1



fig. 2



### Regeneration of the filter materials and mechanisms

The PROaqua 4200 drinking water filter is easily regenerated by the user him/herself, with regular maintenance costs being approx. €2/year. Regeneration should take place approx. every 3 months; in special cases more often, when:

- the absorption capacity of the nitrate or lime resin is exhausted. Example: In cases of a nitrate load of approx. 100 mg/l and a consumption of approx. 10 l/day, regeneration is recommended as from a nitrate leakage of approx. 10 mg/l, which corresponds to an interval of approx. 12 weeks.
- after a long filtering period, the germ filter is obstructed more and more by bacteria (this is noted by a reduced flow rate from 2.5 l/min to e.g. 1 l/min).
- the filter is used for the first time or after a long period of disuse.
- cartridges or membranes have to be replaced.

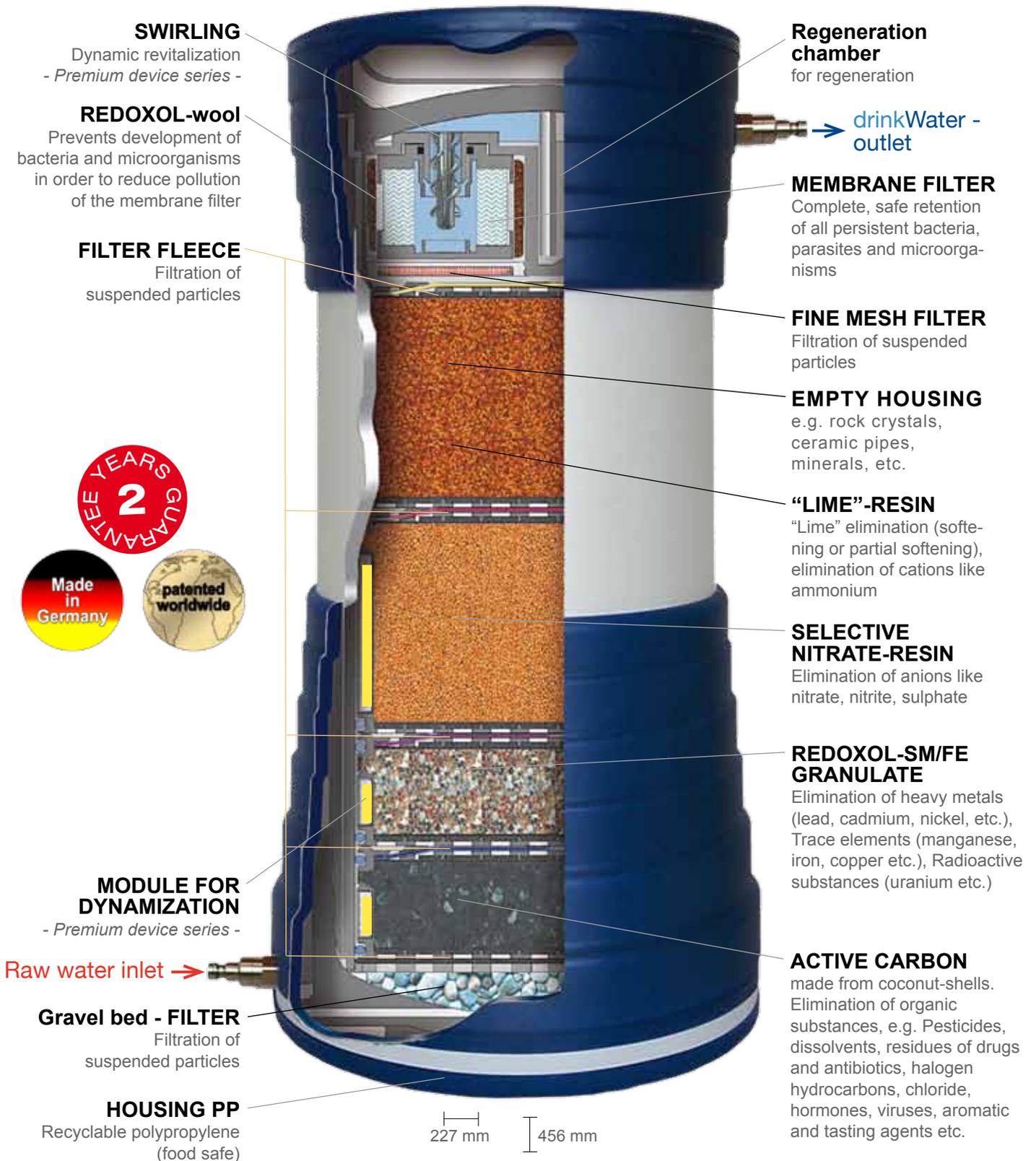
### Assembly for regeneration

For regeneration, the filter device is turned upside down and the hoses are connected in inverse order. The red inlet hose is connected to the socket on top of the filter device and the blue outlet hose to the socket on the bottom of the filter device. The counter current regeneration guarantees an optimum cleaning of all the filter mechanisms and the membrane filters. By means of the inverse position of the filter device for regeneration, the contaminants are driven directly out from the bottom layers of the device. Not even the gravity of the water affects the stream conditions inside the filter mechanisms.



A detailed description of the regeneration process is to be found in the user manual.

# PROaqua 4200 FILTER CUT



## FILTER MECHANISMS

Depending on water contamination and the requirements of the end consumer, the PROVITEC PROaqua 4200 water treatment filter can be equipped with different filter mechanisms, i.e.:

- to eliminate bacteria, parasites and microorganisms:
  - Fractional membrane filtration -
- to eliminate nitrate, nitrite, sulphate:
  - Nitrate selective anion exchanger -
- to eliminate lime, ammonium, potassium etc:
  - Cation exchanger -

### Selective anion exchanger

Nitrate and nitrite ions are exchanged with chloride ions (component of common salt) by means of a selective anion exchanger. The remaining absorption capacity of the ion exchanger can be checked easily and quickly with the available test rod for nitrates (1 minute).

If the colour indicates a quantity of nitrate of more than 10 mg/l, the filter should be regenerated. In conventional nitrate water filters, the anion exchanger cartridge would have to be replaced.

The PROaqua 4200 is different. "Counter current regeneration" is easily carried out by the user him/herself who can clean and disinfect all filter mechanisms. The same applies to the cation exchanger. Regeneration costs, necessary about every three months, amount to approx. €0.50. Regular costs for filter cartridges or membranes are not necessary.

The ion exchangers used in the PROVITEC PROaqua 4200 water treatment filter can be regenerated more than 1,000 times. Therefore its service life far exceeds 25 years.

### Special activated

The organic substances to be found in drinking water (eg. Pesticides, volatile halogen hydrocarbons, chlorine, residues of drugs and antibiotics, etc.) are adsorbed/absorbed by a special activated carbon. The activated carbon granulates used in the PROaqua 4200 are obtained from coconut rind through a charcoal process and have a much higher absorption capacity than conventional activated carbon.

### REDOXOL Granulates

The "REDOXOL" granulates used in the PROaqua 4200 produce spontaneous oxidation-reduction processes and obtain filter effects that also occur in nature. Specially treated copper and zinc react to a great number of

- to eliminate organic compounds (i. e., pesticides, halogen hydrocarbons, chloride, PAHs, residues of drugs and antibiotics, viruses etc.):
  - Activated carbon obtained by charcoal process from coconut rind -
- to eliminate lead, cadmium, nickel, copper, iron, radioactive substances (uranium) etc.:
  - Different REDOXOL-granulates -
- to enrich with the minerals calcium and magnesium:
  - Dolomite rocks -

inorganic substances, heavy metals and trace elements (e.g. lead, cadmium, nickel, copper, iron, manganese, uranium etc.) and eliminate them.

### DOLOMITE rocks

Certain minerals, such as calcium and magnesium, are favourable and even necessary from a nutritional point of view. If they are not contained in the raw water, with the Dolomite rocks they can be added to the treated water up to saturation.

### Cation exchanger

Upon request, the PROaqua 4200 can also be equipped with a cation exchanger to eliminate "lime" from the drinking water (lime is a compound of the minerals calcium and magnesium), either partially or completely, in order to improve the flavour of coffee or tea or to avoid sediments in household appliances (for regeneration see "Selective Anion Exchanger").

### Membrane filter

It has been demonstrated that the specially prepared membrane filter retains and eliminates completely all kinds of bacteria, parasites and microorganisms.

Public Authorities often criticise water filters because "in cases of insufficient maintenance they can provoke the development of bacteria, parasites and microorganisms being conveyed into the drinking water", but with the PROaqua 4200 this is absolutely not the case. The membrane filter is also used in serological and medical applications and meets maximum safety requirements.

It goes without saying that the PROVITEC PROaqua 4200 drinking water treatment filter consists of recyclable, food-safe materials that do not contain any plasticizers, solvents or adhesives.

## REGENERATION OF THE FILTER MATERIALS AND MECHANISMS

The PROaqua 4200 drinking water filter is easily regenerated by the user him/herself, with regular maintenance costs being approx. 2\$/year.

Regeneration should take place approx. every 3 months; in special cases more often, when:

- the absorption capacity of the nitrate or lime resin is exhausted. Example: In cases of a nitrate load of approx. 100 mg/l and a consumption of approx. 10 l/day, regeneration is recommended as from a nitrate leakage of approx. 10 mg/l,
- which corresponds to an interval of approx. 12 weeks.
- after a long filtering period, the germ filter is obstructed more and more by bacteria (this is noted by a reduced flow rate from 2.5 l/min to e.g. 1l/min).
- the filter is used for the first time or after a long period of disuse.
- cartridges or membranes have to be replaced.

Description of filter cartridges	Cartridge codes and sizes available	Parameters/features	Life cycle for the average consumption of a household with 4 persons
Nitrate-resin cartridges (anion exchanger)		Elimination of anions: Nitrate, nitrite, sulphate.	To be regenerated by the user him/herself. Service life of far more than 25 years.
Limeresin cartridges (cation exchanger)		Elimination of cations: Lime (complete softening), ammonium, potassium, etc.	To be regenerated by the user him/herself. Service life of far more than 25 years.
Lime resin cartridges (cation exchanger) with bypass		Lime (partial softening).	To be regenerated by the user him/herself. Service life of far more than 25 years.
Activated carbon cartridges		Organic substances like pesticides, volatile halogen hydrocarbons etc., as well as viruses, chlorine, aromatic and tasting agents.	Depending on the contamination load of the water to be filtered, up to 5 years.
REDOXOL-SM cartridges		Lead, cadmium, nickel, radioactive substances (e.g. uranium) etc.	Depending on the contamination load of the water to be filtered, up to 5 years.
REDOXOL-FE cartridges		Iron, manganese, etc.	Depending on the contamination load of the water to be filtered, up to 5 years.
Active/PLUS-SM cartridges		Combining properties of activated carbon and REDOXOL-SM.	Depending on the contamination load of the water to be filtered, up to 5 years.
Active/PLUS-FE cartridges		Combining properties of activated carbon and REDOXOL-FE.	Depending on the contamination load of the water to be filtered, up to 5 years.
Dolomit cartridges		Enriching with calcium and magnesium.	Depending on the saturation of the filtered water, up to 2 years.
Sediment cartridges		Elimination of sediments and volatile Substances	Depending on the sediment load of the water to be filtered, up to 5 years.
Empty casing cartridge		Incorporation of filter substances for energetization (e.g. rock crystal, ceramic pipes).	Depending on the level of energetization and the mechanisms employed.
Membrane filter (germ filter)		Elimination of bacteria, parasites and Microorganisms	Depending on the microbiological load of the water to be filtered, up to 5 years.

**For what purposes can the filtered drinking water be used?**



Drinking water treated with the PROaqua 4200 is perfectly suitable for cooking, drinking, washing of vegetables, preparation of baby food, face cleansing, watering plants or for pets to drink etc. The PROaqua 4200 water filter can always be installed where quantities of approx. 2 liter/min (industrial model 4.5 liter/min) are sufficient, e.g. in households (kitchen sink), gastronomy, caravans, private boats, other technical appliances etc.

**How is the PROaqua 4200 drinking water filter connected to the water supply system?**



The PROaqua 4200 drinking water filter is normally a bottom unit, usually installed beneath the kitchen sink, and the drinking water is drawn from a special tap. The existing kitchen fittings can still be used for washing and cleaning activities. However, you can also use double kitchen fittings i.e., fittings with an integrated second outlet only for filtered water. The average installation time for the bottom unit is approx. 30 minutes. other technical appliances etc.

**What should be taken into account if the filter is not used for a longer period?**



If the filter is not used for a longer period (after more than 4 weeks in disuse), it should be regenerated as indicated in the user's manual. Thus, the filter mechanisms, the membrane filter and the complete filter system are "refreshed", disinfected and cleaned. If the filter has not been used for a short time (about 3 days), it is sufficient to let 10 litres of water flow through the device in order to eliminate the remaining water in the filter housing.

**Why is the PROaqua 4200 not installed directly to the domestic water supply?**



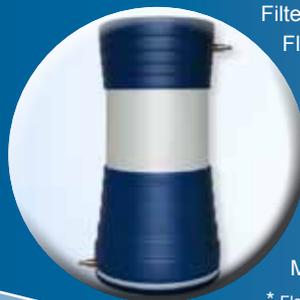
Average water consumption per day and person in Europe is approx. 140 l. However, only 5 litres of drinking water is required. The remaining water volume of 135 l is used for body care, W.C., car washing, garden etc. Treatment of the water for domestic use as high quality drinking water is unnecessary, uneconomical and no longer opportune under ecological aspects.

**Do the filter mechanisms used in the PROaqua comply with food regulations?**



Yes. All the filter mechanisms and materials used are food-safe and subject to stringent controls. Even the plastic parts used in the PROaqua are thermally welded and do not contain any plasticizers, dissolvents or adhesives.

**Technical data**



Filter media contents	3,9 - 4,2 l.
Flow rate	approx. 2,5 l/min. (3 bar)*
Flow rate Industrial model	approx. 4,5 l/min. (3 bar)*
Cost per regeneration	approx. 0,5 USD
Regeneration quantity	approx. 30 l.
Total height	45,6 cm
Maximum diameter	22,7 cm
Weight (standard device)	ca. 8,5 kg
Max. operation pressure	4 bar

\* Flow rate dependent on the used fittings and connected devices.

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