Clean water straight from the tap

Domestic water treatment plants

ECOWATER SYSTEMS®

Clean water.
Green future.™

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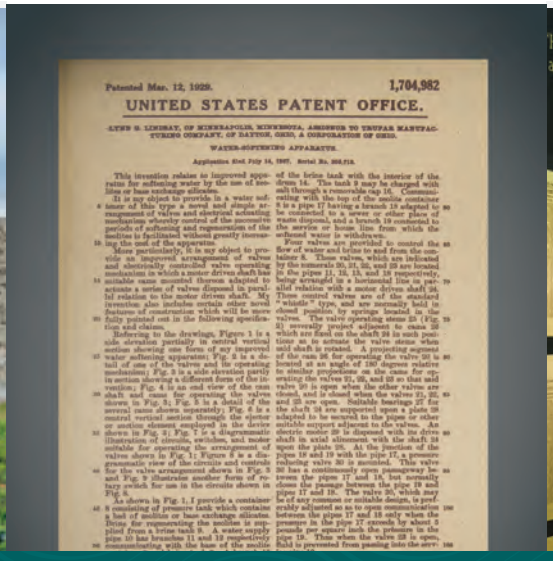


Patented Mar. 12, 1929. 1,704,982

UNITED STATES PATENT OFFICE.

LYNN S. LINDSAY, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO VIKING MANUFACTURING COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

WATER-SOFTENING APPARATUS.

Application filed July 14, 1927. Serial No. 205,713.

This invention relates to improved apparatus for softening water by the use of zeolites or base exchange silicates.

It is my object to provide in a water softener of this type a novel and simple arrangement of valves and electrical actuating mechanism whereby control of the successive periods of softening and regeneration of the zeolites is facilitated without greatly increasing the cost of the apparatus.

More particularly, it is my object to provide an improved arrangement of valves and electrically controlled valve operating mechanism in which a motor driven shaft has suitable cams mounted thereon adapted to actuate a series of valves disposed in parallel relation to the motor driven shaft. My invention also includes certain other novel features of construction which will be more fully pointed out in the following specification and claims.

Referring to the drawings, Figure 1 is a side elevation partially in central vertical section showing one form of my improved water softening apparatus; Fig. 2 is a detail of one of the valves and its operating mechanism; Fig. 3 is a side elevation partly in section showing a different form of the invention; Fig. 4 is an end view of the cam shaft and cams for operating the valves shown in Fig. 3; Fig. 5 is a detail of the several cams shown separately; Fig. 6 is a central vertical section through the ejector or suction element employed in the device shown in Fig. 3; Fig. 7 is a diagrammatic illustration of circuits, switches, and motor suitable for operating the arrangement of valves shown in Fig. 1; Figure 8 is a diagrammatic view of the circuits and controls for the valve arrangement shown in Fig. 3 and Fig. 9 illustrates another form of rotary switch for use in the circuits shown in Fig. 8.

As shown in Fig. 1, I provide a container 8 consisting of pressure tank which contains a bed of zeolites or base exchange silicates. Brine for regenerating the zeolites is supplied from a brine tank 9. A water supply pipe 10 has branches 11 and 12 respectively communicating with the base of the zeolite tank 8 and with the interior of the brine tank 9. The latter tank may be charged with salt through a removable cap 13. Communicating with the top of the zeolite container 8 is a pipe 17 having a branch 18 adapted to be connected to a sewer or other place of waste disposal, and a branch 19 connected to the service or house line from which the softened water is withdrawn.

Four valves are provided to control the flow of water and brine to and from the container 8. These valves, which are indicated by the numerals 20, 21, 22, and 23 are located in the pipes 11, 12, 13, and 18 respectively, being arranged in a horizontal line in parallel relation with a motor driven shaft 24. These control valves are of the standard "whistle" type, and are normally held in closed position, by springs located in the valves. The valve operating stems 25 (Fig. 2) reversally project adjacent to cams 26 which are fixed on the shaft 24 in such position as to actuate the valve stems when said shaft is rotated. A projecting segment of the cam 26 for operating the valve 20 is located at an angle of 180 degrees relative to similar projections on the cams for operating the valves 21, 22, and 23 so that said valve 20 is open when the other valves are closed, and is closed when the valves 21, 22, and 23 are open. Suitable bearings 27 for the shaft 24 are supported upon a plate 28 adapted to be secured to the pipes or other suitable support adjacent to the valves. An electric motor 29 is disposed with its drive shaft in axial alignment with the shaft 24 upon the plate 28. At the junction of the pipes 19 and 19 with the pipe 17, a pressure reducing valve 30 is mounted. This valve 30 has a continuously open passageway between the pipes 17 and 18, but normally closes the passage between the pipe 19 and pipes 17 and 18. The valve 30, which may be of any common or suitable design, is preferably adjusted so as to open communication between the pipes 17 and 18 only when the pressure in the pipe 17 exceeds by about 5 pounds per square inch the pressure in the pipe 19. Thus when the valve 23 is open, fluid is prevented from passing into the serv-

Water: without it, life would not exist on earth…

Water from the oceans, lakes and rivers has always been reused, purified and filtered by nature itself through evaporation and then rain. However, more and more often these natural processes are not sufficient.

Some water problems are caused by nature itself…

Water during circulation encounters various obstacles: rocks, minerals, organic pollutants. They change adversely chemical and physical properties of water.

…but all the rest is caused by human action

Water is also polluted by the products of our modern day civilization: pesticides, fungicides, the thousands of synthetic chemical products which filter down to the ground water level.

Water treatment is a necessity

Water after having absorbed undesired components becomes unsuitable for drinking. Unfortunately, due to high cost of transportation, water is often treated near the place of intake. The quality often leaves much to be desired.

Treatment by water supply companies

Water treated on an industrial scale, which flows from our taps, must meet only the basic standards of purity and quality.

The quality of the tap water is not always optimal

- in order to destroy bacteria, toxic chemical products like chlorine are used, what gives a bad taste and unpleasant odour to the water
- water is not usually treated for hardness, which progressively damages household appliances and consumes an excessive amount of energy
- despite the standards are met, all kinds of particles are left in water, thereby spoiling its quality.

Bottled water?

Faced by these problems, one can, as an individual, opt for bottled water. However, manufacturing and transporting this product consumes precious energy and makes it expensive, not to mention the added chore of picking it up and bringing it home from the store.

Water from own intake?

Given the rising cost of tap water, more often people decide on their own well. However, in general, own source of water does not meet drinking water standards, and the water must first be treated.

The perfect solution: water treatment at home as to one's own needs

We tailor the device to the quality of water in your home. Our experts will help you diagnose the existing water problems, select the suitable unit and install it.

What's up with the water?

Hard Water:
Hard water occurs when water passes through rock and picks up the calcium and magnesium. Hard water is easy to spot: it is the scum that collects on shower walls, leaves a bathtub ring, dulls your laundry, leads to lacklustre hair and clogs your pores. It makes household cleaning difficult. Hard water deposits also clog pipes, cause water heaters to work inefficiently, shortening the life of water-using appliances

Water with excessive amounts of iron and manganese:
Iron water is caused by water passing through iron-bearing rocks. Because iron accounts for 5% of the earth's crust, it can be found in just about all types of water supplies. Iron water can stain sinks and laundry, and it can form scale on pipes and water-using appliances.

Chlorine: Tastes and smells like a swimming pool:
We know the smell of chlorine from the pool visits. We do not necessarily want to drink tea prepared with such water, wash hair or cook a favourite meal.

Hydrogen sulphide:
Decaying vegetation and oil deposits beneath the earth's surface create the gas with a characteristic unpleasant odour.

Milky water:
Suspended solids in your water give it a cloudy, milky, foggy appearance. These particles can clog pipes and drains. They shorten the life of valves and gaskets.

Acid Water:
Blue-green stains are the signs of acid water. It can result in rust on plumbing fixtures, and it can eat away chrome faucets, fittings and pipes.

For years, we are experts in the field of water treatment

We are the world's largest manufacturer of household water treatment systems. For nearly 90 years we have been creating and developing innovative technologies that can provide pure water at every home.

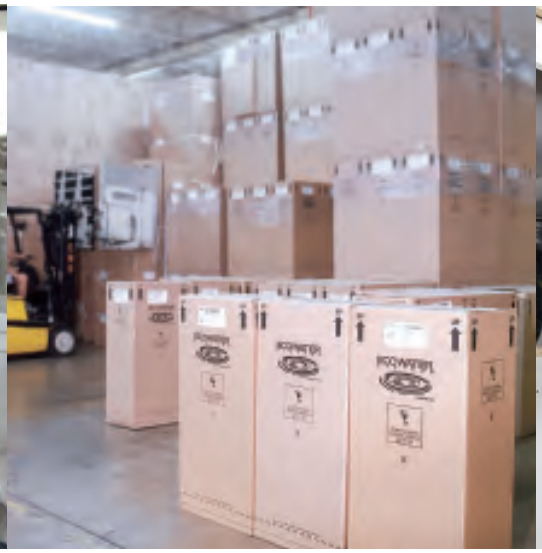
EcoWater products are the result of many years of research and hundreds of patents developed by our scientists and engineers.

High quality and investing in research and development are the basis of our business. Our headquarters and factories are located in the United States, where all of our equipment is produced, in accordance with the ISO 9001 certification procedure.

We have branches in many countries around the world. We are a company owned by Berkshire Hathaway, which is a member of the Marmon Group, a private capital group on an international scale, with more than 140 autonomous manufacturing and service companies. We are a member of the WQA (Water Quality Association), a global non-profit organization, which protects the quality of equipment used for treating and filtering water.

With us you get:

- patented and proven technology to improve the quality of your water;
- technical support and exceptional service care of EcoWater partners, who are experts in the field of water treatment;
- products specifically designed for the needs of tap water or well water;
- a complete range of softeners and filters to improve water quality at home;
- long-term guarantees and quality certificates.



Not happy with the quality of your water? Is the kettle scaled and are there white or rust colored deposits in bathroom? Is water not crystal clear and has it an unpleasant smell? The Ecowater authorized partner will help you in solving these and other problems caused by poor water quality.

Each of our partners is a professional in the field of water treatment, who may help in the proper selection of unit adapted to existing conditions and individual needs.

Find the current list of authorized EcoWater partners: www.ecowater.pl

Eko-responsibility

As our name implies, EcoWater is committed to using water responsibly – from the design and production process, to manufacturing the most efficient softeners on the market today. But our responsibility and commitment extend to more than just water. After all, "Eco" was part of our name long before "green" became the global standard it is today.

Eco-Friendly Water Systems

- EcoWater Systems is the only water treatment manufacturer that purchases carbon offsets through the sale of each product, and is certified to have a carbon neutral footprint.
- EcoWater water softeners use fewer than 17.5 kilowatt hours of energy per year. That equates to less than $2.00 per year to operate your EcoWater water softener.
- Our water softeners, conditioners and refiners regenerate only as needed, saving on water and salt.
- We offer HydroLink® technology in our water conditioners and refiners, which monitors your family's water consumption, creating awareness of water usage.
- An EcoWater softener boosts the efficiency of other water using appliances such as your water heater, washing machine and dishwasher by eliminating scale build-up in the appliances.

Health and Safety

- EcoWater eliminates the use of harmful compounds in its manufacturing process.
- Your EcoWater-treated water keeps countertops, sinks, tubs and showers free from the build-up of scale, as well as dirt and grime.
- Use less soap and cleaning detergents, which results in less that ends up down the drain and into your community's ground water or water system.

Reduce, Recycle, Reuse

- EcoWater follows an integrated approach to recycling and waste management. We apply this approach from the earliest stages of product design through manufacturing and shipping.
- We are diligent about measuring and controlling our energy usage and air and water emissions.
- Advanced engineering of our water softeners and water refiners leads to a reduction in your home's energy consumption and extends appliance life cycles, all of which lead to a smaller environmental footprint.
- EcoWater continually reduces the environmental impact of our products, including the way they are packaged, shipped and sold.
- Water used in manufacturing and testing product is captured and reused.

Softeners
EcoWater Systems

Easy to use control panel with backlit screen and multilingual menu (including the Polish language)

Unique, rear-mounted bypass valve (included in the price of softener)

Hard water, being a heat insulator, unnecessarily absorbs up to 60% of the energy produced to heat all the water in the house, including the water in the washing machine, the dishwasher etc. Installation of a water softener would help all your home appliances, water heaters, plumbing, sanitary fittings etc. last longer and function better.

Soft water in all the taps at home:

- EcoWater softeners protect your family and your appliances
- safeguard the environment
- reduce expenses

Pamper your family:

- softer skin without irritation
- silkier hair
- preserved intense colours of clothes even after many washings
- softer laundry

Make life easier and reduce your expenditure:

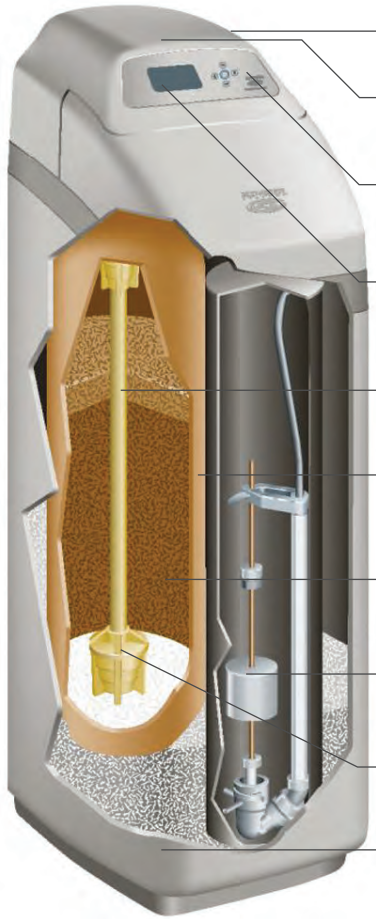
- less energy consumption
- up to 60% less use of cleaning and hygiene products
- lower repair and equipment replacement bills
- cleaning and household work made easy
- gleaming plates and spotless glassware

EcoWater Systems water softeners

ESM 9 CE+, ESM 11 CE+, ESM 15 CE+, ESM 18 CE+, ESM 25 CE+, ESM 42 HTE+, ECR 3502 R70

Optional:
Portable monitor panel allows you to change settings of electronics and control softener work from anywhere in the house





Unique, rear-mounted bypass valve

Patented electronically controlled head, resistant to high pressure fluctuations and poor quality of tap water

Technologically advanced, yet easy-to-use control panel, having a number of useful features

Display with menu in Polish, automatically backlit in dark rooms

Water riser with 1" diameter to increase the flow rate

Multi-layer fibreglass-wrapped tank for the bed, resistant to corrosion

Special ion-exchange bed providing excellent filtration while maintaining optimal flow rate

Brine valve controls the flow of water to and from the brine tank, features automatic shut-off to prevent over filling.

The patented self-cleaning bins of the riser (lower and upper)

Brine tank made of high density polyethylene, impact resistant and non-deformable

EcoWater Systems softeners – principle of operation:

The EWS softener contains special ion-exchange bed, which removes from water calcium and magnesium ions causing water hardness. When exchange capacity of the bed is exhausted, it is automatically recharged with a solution of salt. The EcoWater softeners are installed on the main cold water connection.

Only a place with water input/output for the whole house, electric socket and sewage drain are required for the installation. The EWS softener operates in automatic mode and does not require user intervention, except for periodic refilling the container with salt tablets (usually once a few months), about which the device reminds itself.

Automatic sediment filter
EcoWater Systems

Insoluble impurities in water may eventually damage household equipment and appliances. Due to use of the EcoWater AFF filter, which stops sediments, life of devices such as softeners, water heaters, washing machines and dishwashers will be greatly extended. Sediments may contain particles of rust, which often results in the appearance of brown, yellow or rust stains on laundry, fittings and sanitary equipment.

Filtered water in all water intakes at home:

- the sediment filter protects installations and household appliances
- purifies water from slurry and sludge

Comfort and savings:

- automatic backwashing – a maintenance-free device
- less bills for repair and replacement of household appliances into new ones

Health and safety:

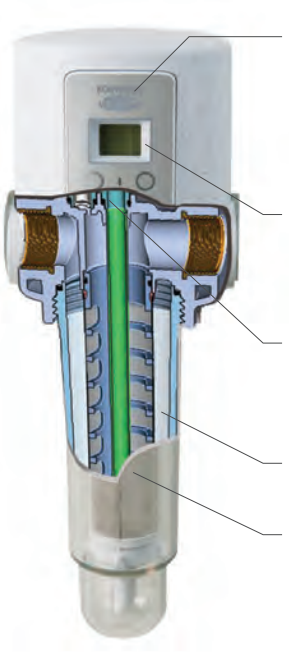
- regular backwashing to ensure a clean filter surface
- no risk of microorganism proliferation
- safe operation of the water system

EcoWater Systems sediment filter:

AFF

Principle of operation:

The EcoWater AFF sediment filter connects to the main cold water line. As water passes through the filter it travels through a stainless steel screen that prevents the sediment, such as sand, pipe deposits etc., from entering the home. The trapped sediment is then automatically flushed to the drain system. The EcoWater AFF filter is a maintenance-free device.



Central water filtration system
EcoWater Systems

A unique control valve, not causing significant decrease in water pressure

Unique, rear-mounted bypass valve (included in the price of filter)

In most cases, water from municipal intakes contains chlorine or its compounds. Their presence in water is essential for the bacteriological safety. Chlorine is used for water disinfection. A side effect of its presence is specific and unpleasant taste, appearance and smell of water.

Filtered and clear water for your whole home:

- the central water filtration system cleans water from impurities
- reduces the smell of chlorine
- protects environment and reduces costs

Take care of your health and comfort:

- skin without irritation
- tasty and safe tap water
- coffee and tea develop their full flavour
- more effective food preparation

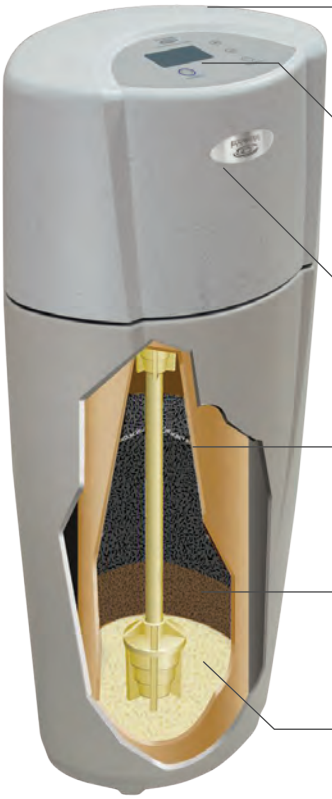
Stand on the economy and ecology:

- no filters to replace
- bed rinsing with water only without any chemicals
- very low power consumption
- no need to buy bottled water

Central water filtration systems by EcoWater Systems:

CWFS





Unique, rear-mounted bypass valve

Multi-function control panel. Programmable frequency of filter rinsing and immediate start of rinsing

Unique and high-tech control valve, which does not cause a significant drop in water pressure

Activated carbon removes unpleasant taste and odour of chlorine in the water, removes or reduces many harmful pollutants, including herbicides and pesticides

Filtrating sand ensures mechanical filtration of 20 micrometers (hair thickness ranges from 50 to 100 micrometers)

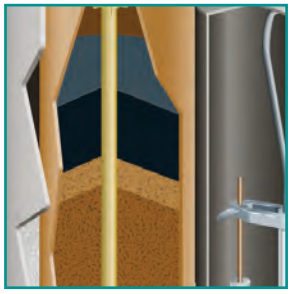
Filtrating gravel optimizes water circulation and provides better cleaning of the bed

Filter with EcoWater Systems multi-function bed – principle of operation:

Water flows through the bed from top to bottom. Treated water is led through a riser to the valve and further to the water system. Bed is backwashed in specified intervals.

Filter with EcoWater multifunction bed is mounted on the main cold water connection. Only a place with water input/output for the whole house, electric socket and sewage drain are required for the installation. It is completely maintenance-free device that improves the quality of water in the entire property (at all water taps).

Refiner
EcoWater Systems



A perfect combination of a softener with a multi-bed filter that improves taste and smell of water is the comfort and economy in one

Unique, rear-mounted bypass valve (included in the price of refiner)

Use water that is safe for you and your home. A refiner is a combination of a softener that protects household appliances against scale and multi-bed filter, which provides clean water without taste and odour of chlorine.

Soft and perfectly pure water throughout your home:

- the refiner cleans water from scale, pollutants and sediments
- reduces the smell of chlorine
- reduces costs and improves comfort

Complete solution:

- excellent water for drinking and cooking
- smooth skin without irritation
- soft laundry and shiny dishes without the use of large amounts of cleaning agents
- protection for household appliances, taps and sanitary equipment against scale and deposits

Benefits for you and the planet:

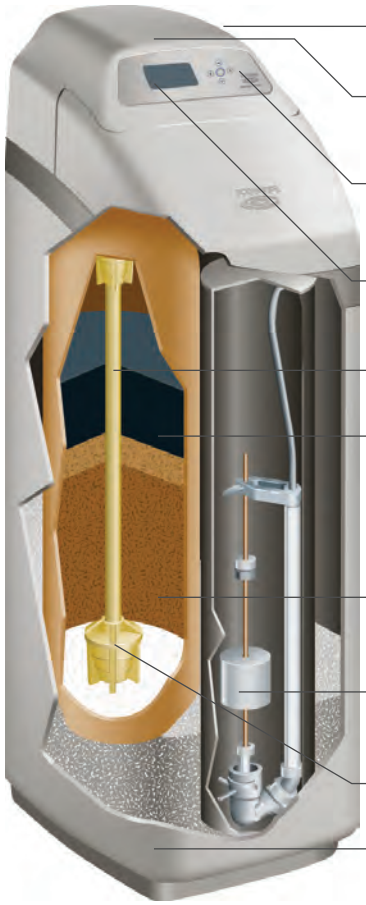
- less energy loss
- less wear of electric and electronic equipment
- lower consumption of chemicals and detergents
- less plastic waste from bottled water

EcoWater Systems Refiner:

ERM 20 CE+

Optional:
Portable monitor panel that allows to change the settings of electronics and control device operation from anywhere in the house





Unique, rear-mounted bypass valve

Patented electronically controlled head, resistant to high pressure fluctuations and poor quality of tap water

Technologically advanced, yet easy-to-use control panel, having a number of useful features

Display with menu in Polish, automatically backlit in dark rooms

Water riser with 1" diameter to increase the flow rate

High quality activated carbon improves the quality of the water throughout the house. Prolongs the life of the ion-exchange bed and eliminates the need for a separate unit with activated carbon

Special ion-exchange bed providing excellent filtration while maintaining optimal flow rate

Brine valve controls the flow of water to and from the brine tank, features automatic shut-off to prevent over filling.

The patented self-cleaning bins of the riser (lower and upper)

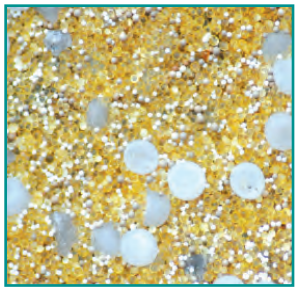
Brine tank made of high density polyethylene, impact resistant and non-deformable

EcoWater Systems refiners – principle of operation:

Special ion-exchange bed removes from water, that flows through the refiner, calcium and magnesium ions causing water hardness. When exchange capacity of the bed is exhausted, it is automatically recharged with a solution of salt. By adding a layer of activated carbon to the refiner, unpleasant taste and smell of chlorine is removed from water, without the need for a separate unit with activated carbon.

The EcoWater refiners are installed on the main cold water connection. Only a place with water input/output for the whole house, electric socket and sewage drain are required for the installation. The refiner operates in automatic mode and does not require user intervention, except for periodic refilling the container with salt tablets (usually once a few months), about which the device reminds itself.

Multi-purpose filters
EcoWater Systems



Special multifunctional bed removing many impurities from water at the same time, does not require the regeneration with harmful chemicals

The water from own wells often do not meet the standards of drinking water. Iron and manganese present in water in excess can cause, among others, ugly streaks and stains on laundry and fittings. Hard water is a source of sediment and scale. Ammonia can cause the growth of bacteria producing hydrogen sulphide with unpleasant odour of rotten eggs, and organic substance often give yellow-brown color. The Ecowater Systems multi-purpose filters can cope with all the problems.

Unique, rear-mounted bypass valve (included in the price of filter)

Soft and devoid of iron and manganese water from own intake:

- multi-purpose filters remove scale and other contaminants from well water
- they protect our health
- allow the use of water from your own welli

Economy and ecology:

- small quantities of water and salt for recharging
- no need to use harmful chemicals for recharging

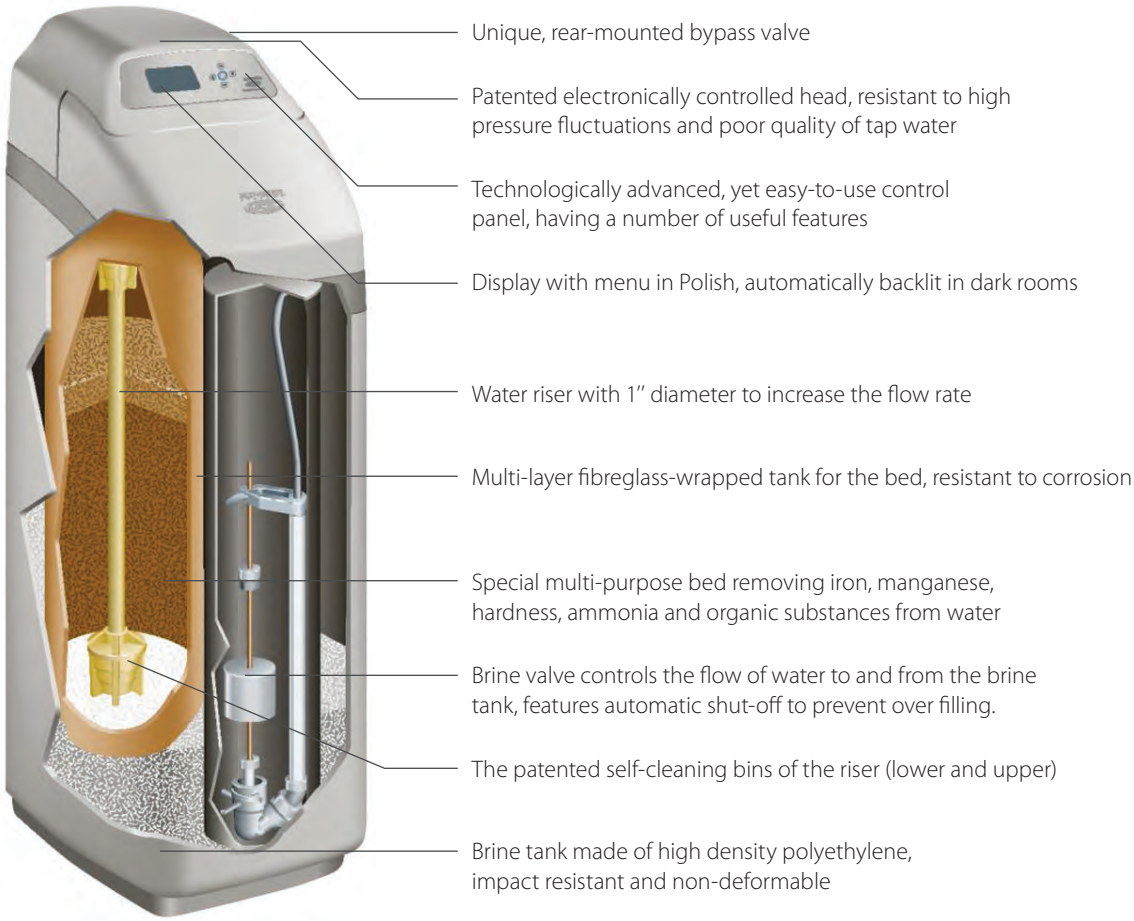
Several problems fixed by a single device:

- drinking water without unpleasant taste, smell and color
- protection of systems and household appliances against scale and sludge
- soft, clean laundry free from unsightly, rust stains
- no risk of ferruginous bacteria proliferation

Multi-purpose filters by Ecowater Systems:

ESM 25 CE ECOMULTI,
ESM 42 HTE ECOMULTI

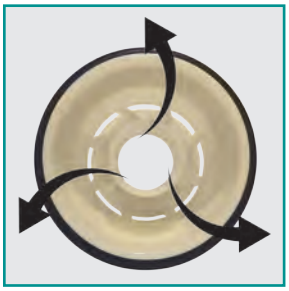
Optional:
Portable monitor panel that allows to change the settings of electronics and control device operation from anywhere in the house



EcoWater Systems multi-purpose filters – principle of operation:

The Ecowater multi-purpose filters contain special bed, which removes iron, manganese, hardness, ammonia and organic substances from water. When capacity of the bed is exhausted, it is automatically recharged with a solution of salt. The EcoWater multi-purpose filters are installed on the main cold water connection. Only a place with water input/output for the whole house, electric socket and sewage drain are required for the installation. The Ecowater multi-purpose filters operate in automatic mode and do not require user intervention, except for periodic refilling the container with salt tablets (usually once a few months), about which the device reminds itself.

Iron filters
EcoWater Systems



The special design of the top distributor in the ETF AIV filter allows to swirl the water flow through the zone of aeration, thus extending the contact between water and air, and therefore the efficiency of iron removing process is improved

Iron and manganese in water are most often the source of rust stains and sediments, cause deterioration of water taste and contribute to the growth of bacteria, which may lead to overgrowth of water pipes. Mechanical impurities can cause water discoloration and turbidity. Acidic water is very corrosive, and hydrogen sulphide odour is perceptible even in small concentrations.

Unique, rear-mounted bypass valve (included in the price of filter)

Custom made devices depending on the water problems:

- iron filters remove impurities from water
- protect human health
- allow to obtain water with parameters meeting the required standards

Clean water, safe for installations:

- protection of systems and household appliances against deposits
- sanitary ceramics and laundry free of rust stains
- no risk of piping corrosion

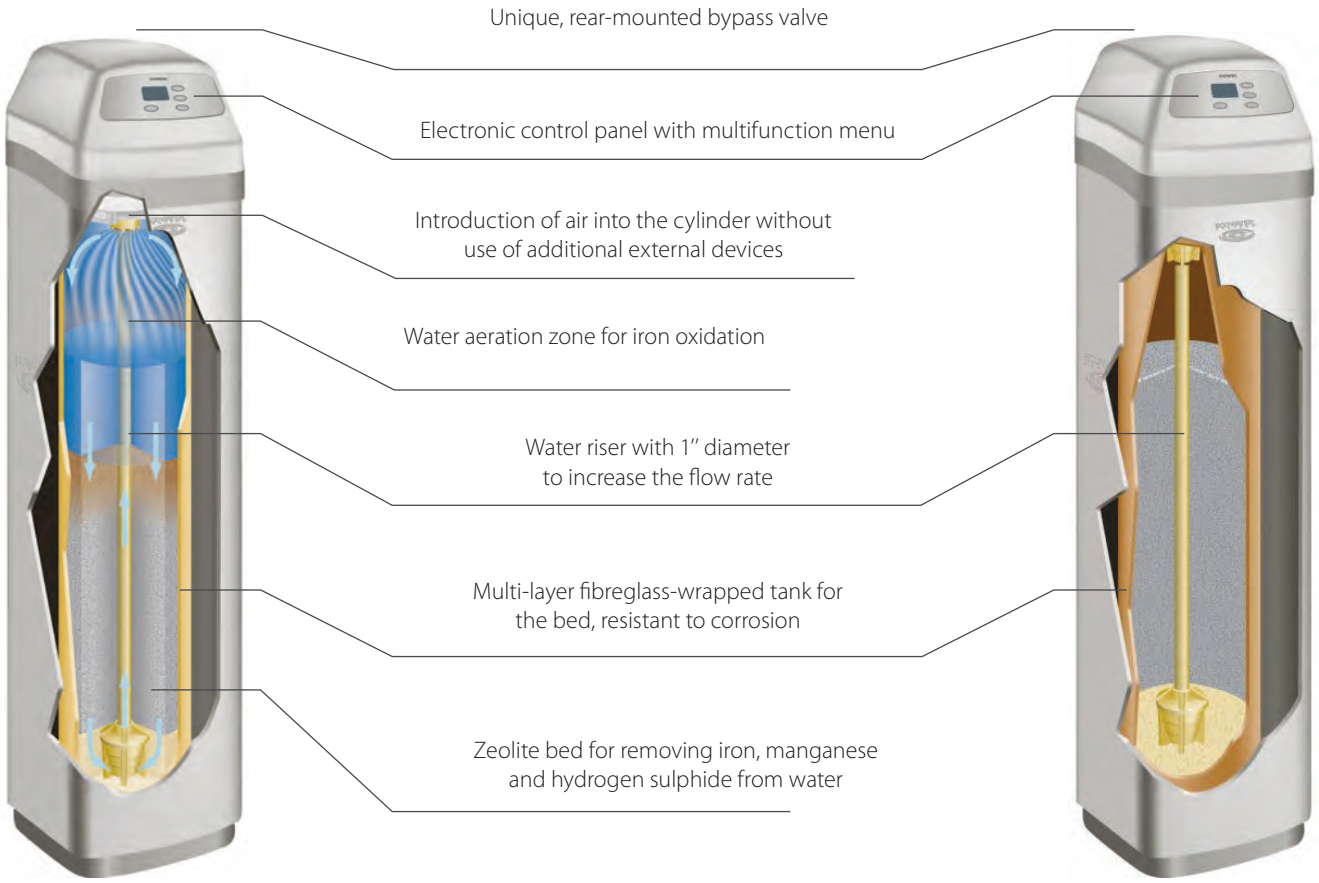
Iron filters by Ecowater Systems:

ETF AIV , ETF 2100 IF10,
ETF 2100 PF10, ETF 2100 PF12

The ETV AIV iron filter – principle of operation:

The ETF AIV iron filter is a device that aerates the water using a special aspirator. Due to this, iron, manganese and sulphur compounds dissolved in water are oxidized, and then removed through the bed. During the recharge, all impurities are flushed from the bed to sewage system, then the device is filled with air.

The filter works without the use of a noisy compressor, and only water is used for recharge of the bed, without use of chemicals.



The ETF IF and PF iron filters – principle of operation:

The ETF IF and PF iron filters are produced without filtering beds. Depending on the water problems, an authorized EcoWater partner will select the optimum bed and fill the device. These beds, depending on the type, can be automatically recharged with a solution of potassium permanganate, or water only.

The EcoWater iron filters are installed on the main cold water connection. Only a place with water input/output for the whole house, electric socket and sewage drain are required for the installation.

We set the standards

- A complete range of water treatment equipment produced by the world's largest manufacturer of this type of equipment.
- Network of certified partners who can install and start up the Ecowater Systems equipment. You do not even need to touch it!
- The latest technology used in every, even the smallest, part.

Effectiveness and efficiency:

- Electronic control in EcoWater devices is based on logic prediction based on the monitoring of water usage in the household, including water demand.
- With their unique control system and counter current recharge, the EcoWater softeners consume less salt and water for recharge than conventional softeners, thus reducing the cost of 1 litre of soft water production.
- They use modern monospheric ion-exchange resin, which provides high ion-exchange capacity. In practice, this translates into the possibility of producing large amounts of soft water between recharges.
- Due to special design of the control valve and configuration of the cylinder size with filtration bed, the devices achieve high flow rates at relatively low pressure loss.
- Extra backwash cycle in case of the water with an increased amount of slurry.

Ease of use and comfort:

- EcoWater softeners are equipped with easy-to-use electronic control panel, providing all the necessary information about the operation. Panel has a menu in the selected language (including Polish).
- Convenient and easy-to-use panel to monitor the softener operation from anywhere in the house.
- Functions of the monitoring panel:
  - alarms (low salt level, service reminder, detected error, improper time after a power failure);
  - recharge option and recharge time can be set;
  - information on the water consumption;
  - information on the salt level and the number of days until salt shortage;
  - information on the amount of water treated before the next recharge.
- Special data protection system that protects the softener memory against data loss, even in case of 72-hour power outage.
- Backlit display and lighting of the salt tank, increasing servicing comfort e.g. during adding salt in dark rooms, such as a cellar, where the device is normally mounted.

Durability and reliability:

- Extremely durable and reliable control valve resistant to large pressure fluctuations and poor quality of tap water.
- Brine tank is made of polyethylene of high density and strength.
- The EcoWater devices are manufactured according to reliable and validated procedures to ensure the highest standards of quality assurance.
- The valve is easier to service and maintain than valves of other brands due to lower number of components (up to 60 parts less); no risk of rust or corrosion (no metal parts in the valve contact with water).
- Dry brine tank in order to avoid the so-called salt deposits.

Frequently Asked Questions

Is softened water suitable for drinking?
You can drink softened water. Only some caution should be taken by those who use salt-free diet.
To soften every 1 German degree of hardness, we add about 8.2 mg of sodium per 1 litre of water. People using salt-free diet should take it into account when calculating the daily intake of salt. Drinking daily 3 litres of softened water, we consume 344.4 mg of sodium, which is equivalent to about 0.87 g of salt. This is an exemplary amount of salt contained in 1 slice of white bread.

Is softened water salty?
The sodium content of softened water increases, while the chloride concentration remains unchanged. The salty taste is produced due to combining sodium and chlorides. Therefore, softened water is not salty.
May salt used for regeneration of resin in a softener be harmful to the environment?
Salt used for softener regeneration does not contain ingredients which are dangerous to human health or environment. The product has a hygienic certificate by National Institute of Hygiene. Furthermore, while softening water to a minimum level determined by the standard in Poland (about 3°dH - German degrees), a negligible amount of salt gets to the sewage system during regeneration.

Does softener promote the growth of bacteria?
Only stagnant water favours the proliferation of bacteria. Water flows daily by the softener, so there is no risk of bacteria growth. In the event of not using water at home for a longer period, e.g. during vacation, a function can be activated in the device due to which the softener will be regenerated every few days in order to prevent the growth of bacteria. Water softening prevents the growth of dangerous bacteria such as Legionella, which accumulate in the scale.

Does the softener completely removes calcium from water, that is necessary for human body?
Adequate calcium intake is essential for human health. However, particles of calcium dissolved in the drinking water are only marginally absorbed by the human body. Water containing calcium provides only a small part of the calcium needed for human. The role of water in the delivery of calcium is completely marginal. Besides, there exist regions in Poland, for example in the mountains, where water is naturally soft and there were no significant calcium deficiencies reported among the local population.

Hasn't been my tap water already treated?
Tap water is assumed to be water that meets drinking water standards. It is already treated water. In Poland, the highest permissible total hardness in drinking water is 28°dH (German degrees). This value is not harmful to health, but means that the water is very hard, which causes numerous deposits on taps, toilets and scaling of the system. The average hardness of tap water in Poland is 18°dH, so the majority of Poles are familiar with the problems caused by hard water.

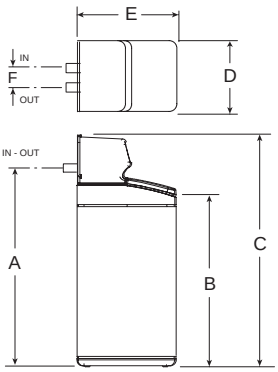
Does scaling increase energy costs?
Yes. Scaling reduces the efficiency of a boiler and heating process in the central heating and domestic hot water systems. Scale with a thickness of 1 mm on surface of a heat exchanger reduces its efficiency by about 10%, thereby increasing fuel consumption by similar value. It is estimated that the cost increase of heating equipment operation due to scale build-up about 20% at an average.

Is it possible to install a water softener in a house with household sewage treatment plant?
In case of draining washings into household biological sewage treatment plants, it is advisable to take some precautions. In such wastewater treatment plants, biological sludge is a breeding ground for bacteria, which convert sediments into a liquid. In a natural way, but also because of chlorides in washings, the amount of bacteria may be too small. This may cause a decrease in efficiency of the wastewater treatment process. In order to prevent biodegradation processes, it is recommended to use products that contain a wide range of bacteria. It is the effective way to support the process of wastewater treatment. Accordingly, letting washings from the device into the household sewage treatment plant is subject to the treatment plant manufacturer's recommendations.

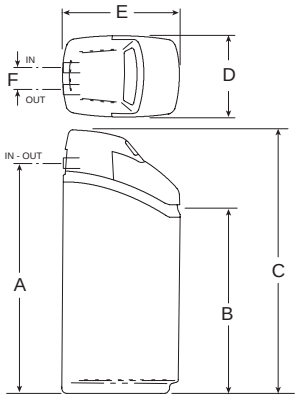
Technical data
Water softeners

	SOFTENERS			
Technical data	**ESM 9 CE+**	**ESM 11 CE+**	**ESM 15 CE+**	**ESM 18 CE+**
Bed volume	9 l	11 l	15 l	18 l
Quantity of active carbon	–	–	–	–
Max. flow rate at hardness < 0,1°dH	0.9 m^3/h	1.0 m^3/h	1.3 m^3/h	1.8 m^3/h
Ion-exchange capacity	28 m^3 x °dH	39 m^3 x °dH	67 m^3 x °dH	73 m^3 x °dH
Max. capacity between recharges at 18°dH hardness	1 600 l	2 200 l	3 800 l	4 100 l
Approximate consumption of salt per a regeneration	1.5 kg	1.8 kg	2.5 kg	3.0 kg
Approximate consumption of water per a regeneration	45 – 55 l	55 – 65 l	75 – 90 l	90 – 105 l
Water temperature	4° – 49°C	4° – 49°C	4° – 49°C	4° – 49°C
Operating pressure	1.4 – 8.6 bar	1.4 – 8.6 bar	1.4 – 8.6 bar	1.4 – 8.6 bar
Connection diameter	1"	1"	1"	1"

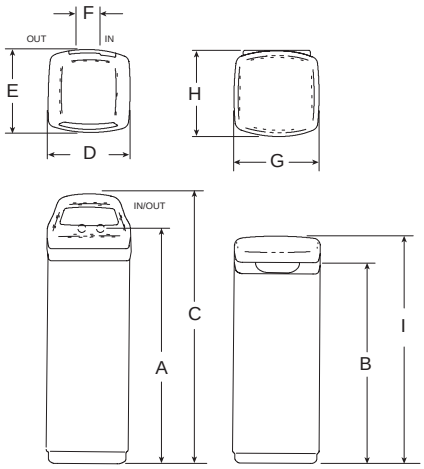
	SOFTENERS			REFINER
Technical data	**ESM 25 CE+**	**ESM 42 HTE+**	**ECR 3502 R70**	**ERM 20 CE+**
Bed volume	25 l	42 l	60 l	20 l
Quantity of active carbon	–	–	–	4.4 kg
Max. flow rate at hardness < 0,1°dH	2.2 m^3/h	3.0 m^3/h	3.9 m^3/h	2.0 m^3/h
Ion-exchange capacity	106 m^3 x °dH	196 m^3 x °dH	221 m^3 x °dH	84 m^3 x °dH
Max. capacity between recharges at 18°dH hardness	5 900 l	10 900 l	12 300 l	4 700 l
Approximate consumption of salt per a regeneration	4.0 kg	7.0 kg	9.0 kg	3.2 kg
Approximate consumption of water per a regeneration	125 – 150 l	210 – 250 l	300 – 360 l	100 – 120 l
Water temperature	4° – 49°C	4° – 49°C	4° – 49°C	4° – 49°C
Operating pressure	1.4 – 8.6 bar	1.4 – 8.6 bar	1.4 – 8.6 bar	1.4 – 8.6 bar
Connection diameter	1"	1 1/4"	1 1/4"	1"



ESM 9 CE+ ESM 11 CE+, ESM 15 CE+



ESM 18 CE+, ESM 25 CE+, ERM 20 CE+



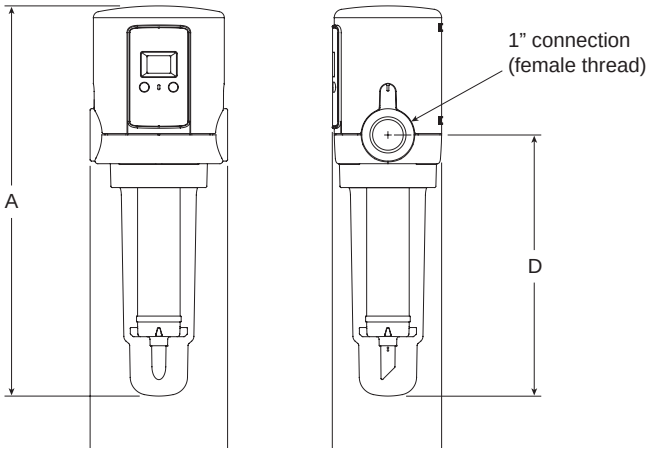
ESM 42 HTE+, ECR 3502 R70

Dimensions	A	B	C	D	E	F	G	H	I
ESM 9 CE+	41.5 cm	29.1 cm	55 cm	32.4 cm	43.2 cm	8.6 cm			
ESM 11 CE+	54 cm	41.4 cm	66.8 cm	32.4 cm	43.2 cm	8.6 cm			
ESM 15 CE+	70 cm	58.4 cm	83.8 cm	32.4 cm	43.2 cm	8.6 cm			
ESM 18 CE+	96.5 cm	83 cm	115.5 cm	35.5 cm	50 cm	8.6 cm			
ESM 25 CE+	96.5 cm	83 cm	115.5 cm	35.5 cm	50 cm	8.6 cm			
ERM 20 CE+	96.5 cm	83 cm	115.5 cm	35.5 cm	50 cm	8.6 cm			
ESM 42 HTE+	126 cm	81 cm	143.8 cm	35.5 cm	35.5 cm	9.5 cm	40.5 cm	40.5 cm	93 cm
ECR 3502 R70	145 cm	81 cm	157.9 cm	35.5 cm	35.5 cm	9.5 cm	40.5 cm	40.5 cm	93 cm

Control panel functions of EcoWater softeners and refiner	ESM 9 CE + ESM 11 CE + ESM 15 CE +	ESM 18 CE + ESM 25 CE + ERM 20 CE +	ESM 42 HTE + ECR 3502 R70
Adjustable backwash & fast rinse times	■	■	■
Max. days between recharges in case of no water intake	■	■	■
12 or 24 hour clock	■	■	■
Automatic recharge start after exhausted resin capacity at 97%	■	■	■
Efficiency mode	■	■	■
Heavy duty backwash	■	■	■
Display of ion-exchange capacity remaining	■	■	■
Display of recharge time remaining	■	■	■
Actual flow rate	■	■	■
Today consumption	■	■	■
Average daily consumption	■	■	■
Gallon or litre units	■	■	■
Second control output	■	■	■
Salt level indicator	■	■	■
Low salt alarm	■	■	■
Language setting (including Polish)	■	■	■
Setting weight units (pounds or kgs)	■	■	■
Setting hardness units (grains or ppm)	■	■	■
Treated water available	■	■	■
Possibility to use remote monitor	■	■	■
Service reminder	■	■	■
Backlit display	■	■	■
Tank light	□	■	□

Technical data

Automatic sedimentation filter

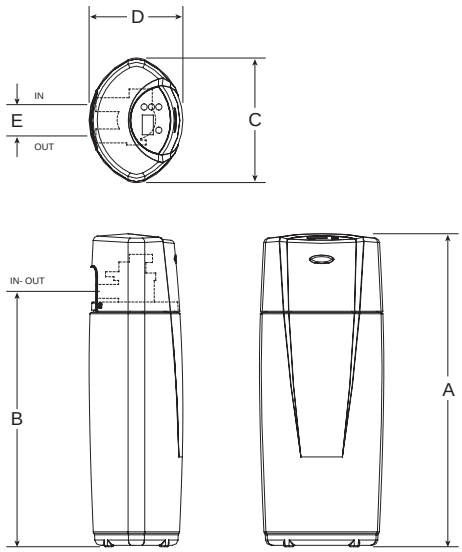


Dimensions	A	B	C	D
AFF	38.1 cm	13.3 cm	10.5 cm	25.4 cm

Technical data	AFF
Size of filtered particles	60 microns
Connection	1" (female thread)
Water pressure [min./max/]	2.0 – 8.0 bar
Water temperature [min./max/]	5 – 40°C
Flow rate at pressure loss of 0.02 bar	3.4 m^3/h
Filter regeneration method	backwash
Number of days between recharge	programmable from 1 to 30
Backwash water consumption	7.5 l
Backwash duration	25 s
Power supply	9 V (battery)

Technical data

Central water filtration system



Dimensions	A	B	C	D	E
CWFS	85.7 cm	69.9 cm	34.1 cm	25.7 cm	8.6 cm

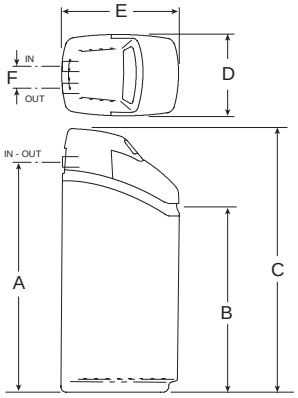
Technical data	CWFS
Bed volume	14 l
Range of flow rates depending on water parameters	0.8 – 3.0 m^3/h
Flow rate of water needed for rinsing	0.8 m^3/h
Approximate bed life depending on water parameters	10 lat
Operating pressure	2.0 – 8.0 bar
Connection diameter	1"

List* of contaminants reduced or removed by the EcoWater CWFS	
Chloride (taste and odour)	Pesticides
Macromolecular organic substances	Herbicides
Radon (limited amounts)	Methyl tert-butyl ether (MTBE)
Many (54) volatile organic chemicals (VOC)	Xylenes
Benzene	Methylbenzene
Carbon tetrachloride	Tetrachloroethylene
Organic molecules poorly water-soluble	Arsenic (limited amounts)
Trichloroethane	Sediments (limited amounts)

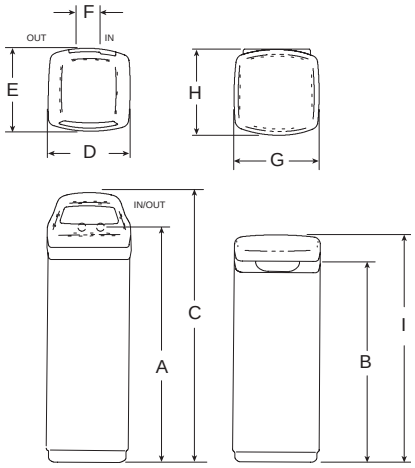
* The above listing is purely indicative and not complete. The actual removal/reduction of contaminates depends on many factors (active carbon type, temperature, contact time, pH, level of contamination, etc). The exact removal or reduction data can only be confirmed by lab testing.

Technical data

Multi-purpose filters



ESM 25 CE ECOMULTI



ESM 42 HTE ECOMULTI

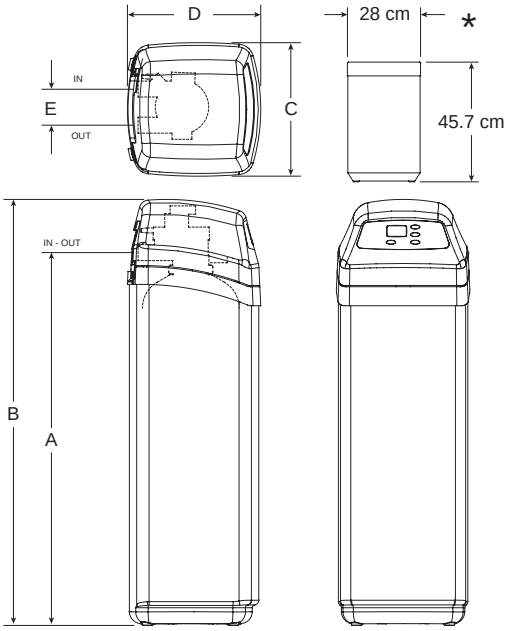
Dimensions	A	B	C	D	E	F	G	H	I
ESM 25 CE ECOMULTI	96.5 cm	83 cm	115.5 cm	35.5 cm	50 cm	8.6 cm			
ESM 42 HTE ECOMULTI	126 cm	81 cm	143.8 cm	35.5 cm	35.5 cm	9.5 cm	40.5 cm	40.5 cm	93 cm

Technical data	ESM 25 CE ECOMULTI	ESM 42 HTE ECOMULTI
Bed volume	25 l	37 l
Max. flow rate at hardness < 0.1°dH	1.3 m^3/h	1.6 m^3/h
Ion-exchange capacity	62 m^3 x °dH	92 m^3 x °dH
Max. capacity between recharges at 18°dH hardness	3 400 l	5 200 l
Approximate consumption of salt per a regeneration	3.0 – 4.0 kg	4.5 – 6.5 kg
Approximate consumption of water per a regeneration	150 l	225 l
Water temperature	4 – 40°C	4 – 40°C
Operating pressure	1.4 – 8.6 bar	1.4 – 8.6 bar
Connection diameter	1"	1 1/4"

Technical data
Iron filters

Dimensions	A	B	C	D	E
ETF 2100 PF10	127 cm	144.8 cm	35.6 cm	35.6 cm	9.5 cm
ETF 2100 PF12	141.6 cm	158.8 cm	35.6 cm	35.6 cm	9.5 cm
ETF 2100 IF10	127 cm	144.8 cm	35.6 cm	35.6 cm	9.5 cm
ETF AIV10	127 cm	144.8 cm	35.6 cm	35.6 cm	9.5 cm
ETF AIV12	141.6 cm	158.8 cm	35.6 cm	35.6 cm	9.5 cm

* Potassium permanganate tank only in ETF 2100 IF10.



Technical data	ETF 2100 PF10	ETF 2100 PF12	ETF 2100 IF10
Possible bed type	Selection of the bed by an authorized EcoWater partner		
Regenerating agent			Potassium permanganate
Min. backwash flow rate	1.1 m^3/h	1.6 m^3/h	1.1 m^3/h
Operating pressure	1.4 – 8.6 bar	1.4 – 8.6 bar	1.4 – 8.6 bar
Water temperature	4 – 49°C	4 – 49°C	4 – 49°C
Connection	1 1/4"	1 1/4"	1 1/4"

Technical data	ETF AIV10	ETF AIV12
Max. iron*, manganese and hydrogen sulfide removal	10 mg Fe/dm^3, 2 mg Mn/dm^3, 3 mg H_2S/dm^3**	
Min. backwash flow rate ***	1.6 m^3/h	2.3 m^3/h
Max. flow rate	2.3 m^3/h	3.4 m^3/h
Approximate water amount for rinsing	460 l	640 l
Max. supply water pressure	5.5 bar	5.5 bar
Water temperature	4 – 49°C	4 – 49°C
Connection	1 1/4"	1 1/4"

* Except for water containing bacteria and organic pollutants.
** Selection and operating parameters to be agreed with an authorized EcoWater partner.
*** The minimum flow rate must be ensured for at least 30 minutes.

Your nearest EcoWater Partner

www.ecowater.pl