



H₂Optimizer



PRODUCT NEWS



Date : Oct-2021

Subject : **H2Optimizer** introduces new compact drinking water treatment system

H2Optimizer DWU-series with an e-pump



THE DWU SERIES SET A NEW STANDARD IN WATER TREATMENT

Our DWU series sets a new standard in drinking water treatment. The quality of tap water is under increasing pressure due to pollution of the source water due to air, soil and surface water pollution with salinization, chemicals and chemical compounds, heavy metals, pesticides, micro-plastic particles, active drug substances, slightly radioactive material from medical research (eg contrast medium), PFASs, PGBs, etc. At the start of the network, water purification companies have to make increasing efforts to supply tap water that meets legal standards. But is water that meets the standard really clean water? The answer is: no! It is suitable for consumption but that is very different from really pure and clean water. Standards concern many types of substances that do not naturally belong in (drinking) water.

That is why H2Optimizer has developed a new generation of drinking water treatment units that optimally purify your tap water at the end of the network and optionally revitalize it and bring it back to the quality and purity of natural spring water. Thanks to innovative techniques, the DWU series supplies ultra-pure and safe water throughout the home, workspace or on board ships, etc.

OPERATING METHOD

Our fully equipped base model works as follows:

- A self-priming electric water pump with frequency regulator supplies pressurized water as soon as a tap is opened somewhere.
- The water then passes through a multiple patented water filter with unique filter properties which are also used in the food industry, hospitals, laboratories, process industry, etc.
- The water is then softened by means of a duplex resin filter. These two resin filters are periodically regenerated with water with a saline solution. Regeneration only takes place when the resin filter is actually saturated, with the system opening a pressure relief valve and starting the process. The advantage of this non-electrical but hydro-mechanical system is that regeneration only takes place when it is really necessary. This prevents unnecessary water and salt wastage. The advantage of a duplex softener is that you always have soft and lime-free water because the resin filters interact with each other. Incidentally, you can choose 100% lime-free water or a little residual lime, which setting can be set manually at any time.
- As the final step in the base unit process, the water passes through a professional grade UV-C water sterilizer for harsh industrial applications. The UV-C light kills 99.99% of any harmful micro-organisms that may still be present, without adding additives to the drinking water.

Now your drinking water is absolutely soft, ultra-pure, hygienic and safe to use, both for you and your precious water devices.



H₂Optimizer

H₂Optimizer DWU-series



WHERE IS THE H2OPTIMIZER DWU SERIES USED AND DEPLOYED?

This can be anywhere where end users place high demands on the quality of tap water, or where there are problems with the water quality of the public network or where a temporary (emergency) drinking water supply has to be provided.

Is there a public network with pipe pressure, but the water quality does not meet the requirements, or are there other factors at play? Then the DWU unit can be used without an electric pump.

For example, for application on board ships or platforms where only a water storage is present without system pressure, our unit is self-supporting thanks to the electric water pump with frequency controller (pressurized-delivery-on-demand). Or making a temporary (emergency) drinking water supply at an event site, a new-build location, etc. can be realized with our DWU unit, available for a fixed or mobile set-up. Our DWU model described here is a complete standard version, but can also be supplied in a modified configuration within the technical possibilities, according to the wishes of the customer or the available installation space.

STANDARD CONFIGURATION

The H2Optimizer DWU-series drinking water units consist of the following main components and fittings as standard, in respective order of water flow:

Self-cleaning 50-micron pre-filter, in combination with the water softener



This innovative pre-filter is a self-cleaning version and works in combination with the water softener. When the softener rinses one of the two resin filters with a salt solution (regenerates), this pre-filter is also automatically rinsed clean and therefore requires no extra attention. This process works hydrodynamically, so without electrical power and is controlled from the water softener.

Self-priming electric water pump with variable speed drive



The frequency converter controls the self-priming electric pump: when water is requested on the consumer side, the frequency converter starts the water pump and adjusts the speed to the correct water yield and system pressure according to the “*pressurized-delivery-on-demand*” principle.

Water manifold



The water manifold or junction line is a brass water line with multiple connections for: water pump/frequency controller, water hammer damper, pressure vessel and water filter. There is also a connection with a blind plug which can serve as an injection point for disinfecting the pipe network to the tapping points in case of biofilm formation with possible microbiological contamination (for example: *Legionella pneumophila* Sero Group 1 bacteria, cause of the infamous Legionnaires' disease).

Patented dual-stage heavy-duty water filter



Medium removal percentages > short list:

Chlorine	: 100%
Chloroform	: 99.5%
Phenols	: 98%
Pesticides	: 97%
Lead	: 99.5%
Copper	: 98%
Cadmium	: 99%

Aquaphor filter patents: *)

DFS: *Dynamic Fixation of Silver*

CFB: *Carbon Fiber Block*

IAM: *Isotopic Adsorption Matrix*

Aqualen™ *ion exchange technique*

*) *For explanations:
see further in this bulletin*

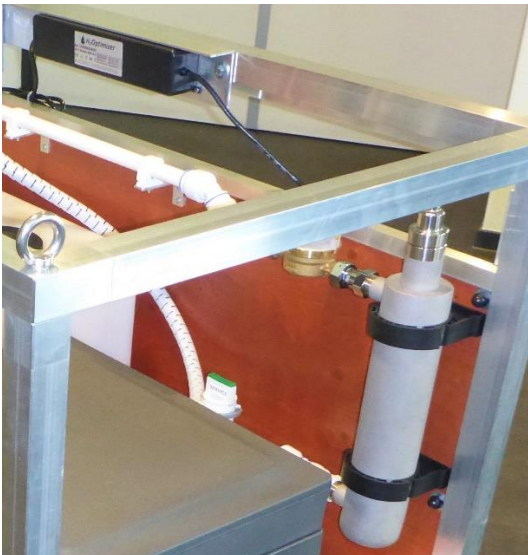
This is an innovative heavy-duty water filter with multiple patented filter technologies. The sediment and activated carbon filter element is also provided with micro-silver particles for an anti-bacterial effect which, thanks to a special fiber structure, maintain their position during the entire use cycle (Aquaphor CFB, DFS and IAM technology patent). In addition, it also contains the patented Aqualen™ technology which, based on the ion exchange principle, removes positively charged heavy metals, chemicals, pesticides, medicinal substances, slightly radioactive substances (for example from contrast fluid for medical research) and the like. Negatively charged essential minerals, on the other hand, are allowed to pass through.

Hydro-Mechanical (Non-Electric) Operating Duplex Water Softener



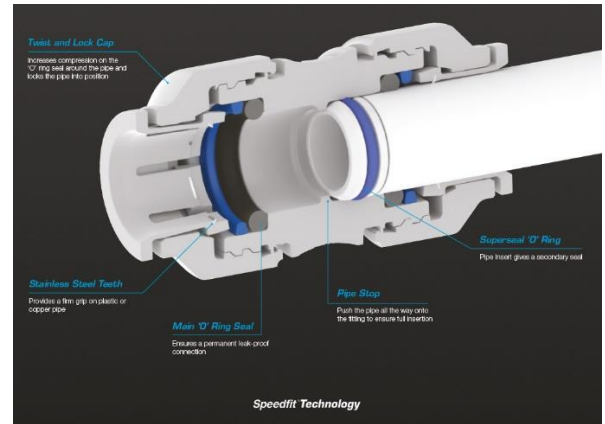
This duplex water softener with integrated salt drawer does not work with an electronic timer that will regenerate after x number of minutes, even if the resin filter is then only about 50% saturated, but with a mechanical pressure relief valve. Only when the resin filter is (almost) completely saturated will the factory set back pressure open the valve, after which the softener switches to the other resin filter and starts rinsing the saturated resin filter with the aid of a salt solution. This prevents unnecessary water and salt wastage. The duplex principle ensures that you always have soft water. Incidentally, you can choose completely lime-free water or up to 50% residual lime through a manual setting, which can be adjusted at any time to your own preference.

H2Optimizer INOX-line professional UV-C water sterilizer



Our own H2Optimizer **INOX-line** UV-C water sterilizers are especially intended for use under harsh conditions. They are robust and made entirely of a stainless steel housing and lamp holder. An external ballast (controller) ensures the correct light intensity. The advantage of disinfecting with ultraviolet light is that it kills 99.99% of all microorganisms without adding harmful chemicals or other unhealthy additives to the water.

Water pipes & Twist-Lock plug-in fittings



Classical water pipes usually still consist of copper pipes and compression fittings. These have the disadvantage that in case of vibrations and strongly fluctuating ambient temperatures, as often occurs in engine rooms, the pipe connections can start to leak due to expansion and contraction. In addition, internal limescale and biofilm deposits are formed. You certainly do not want the latter because micro-organisms (bacteria) can develop in it, such as the *Legionella pneumophila* Sero Group 1 bacterium, which causes the dangerous Legionnaires' disease. This is a real danger, especially with drinking water storage in warm engine rooms.

That is why we use a special plastic version of water pipes with Twist-Lock plug-in couplings which are approved (Class DNV) for use in the water, beverage and food industry as well as for use in laboratories and medical institutions.

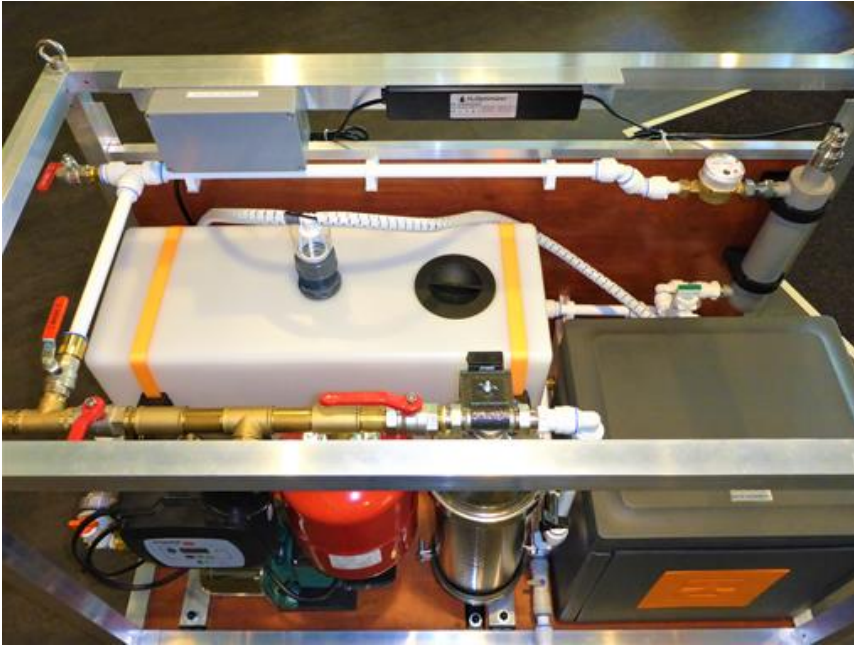
Our JG Speedfix pipes and plug-in couplings have the following advantages: corrosion-free, long life (no thermal aging), no narrowing of the internal passage diameter in the connections, no internal lime and bio-film deposits. Thermal insulating properties of the pipe wall, less chance of freezing due to pipe elasticity, lead-free and non-toxic.

Electrical part



The electrical system is AC220-240V / max 2.65 kW with protective earth. Connections and terminal box have at least protection class IP55. When servicing the water pump/frequency controller and/or the UV-C water sterilizer (replacing the UV lamp), the plug can simply be temporarily pulled out in the IP65 terminal box.

Gray water tank / collection of regeneration flush water



If there is no local water drainage, our DWU drinking water unit has a gray water tank (105 ltr). The self-cleaning pre-filter and the water softener discharge the rinse water through a drain into the gray water tank. This can then be emptied periodically with a separate pump or a general service pump. For this, the gray water tank has a connection at floor height ($\frac{3}{4}$ "-M). In case of sediment deposit on the bottom, the tank can be easily and quickly detached by means of tension straps, and taken out for cleaning elsewhere and then easily put back in place. The 105 liter capacity is sufficient for five rinses. With an average water hardness of approximately 10° Dh, this corresponds to a water consumption of 5000 to 6000 litres.



TECHNICAL SPECIFICATIONS : H2Optimizer DWU model PF25SU40

Electrical water pump : DAB

- Motor : 0,87kW_3x230V_3F_50Hz_2850 rpm_IP55
- Capacity : max 4800 ltr/hr
- Head : max 42,2 mwc

Frequently converter : WaCS

- Model : WaCS PWM II 230 3-BASIC 4.7
- Power : in 1x220-240V 50-60Hz / out 3x220-240V

Water filter : Aquaphor Water Filters

- Model : Viking 300 Maxi
- Filter cartridge, standard : B520-13 / cold water, max 40°C
- Filter fineness : outer layer 20 micron
: inner layer 5 micron
- Water flow : 1500 ltr/hr
- Replacement interval : approx. 100.000 ltr or 12 months

Water softener : Delta Water softeners

- Model : Morava – duplex resin filter
- Resin volume : 2 x 3 ltr
- Operating pressure : 1-8 bar
- Flow (Δp 1 bar) : 2600 ltr/hr
- Exchange capacity : 2 x 150 m³/ppm CaCO₃
- Water cons./regeneration : 18 ltr water softener + 1 ltr pre-filter > 19 ltr
- Salt cons./regeneration : 0,3 kg
- Duration of regeneration : 15 min
- Maximum temperature : 40°C
- Content salt drawer : 15 kg

UV-C water sterilizer : H2Optimizer INOX-series

- Model : UV-C Module 40W H-O (High Output)
- Power : AC220-240V / 50-60Hz
- Water temperature : 5-40°C
- Waterdebit : 2700 ltr/hr
- Burning hours UV-lamp : 8000 > 1x per year with continuous operation

Grey water tank : Wydale Plastics Ltd

- Model : 105U-NA-5-DR-UV
- Material : white semi-transparent, PE plastic

Water connections : Drink water lines

- Incoming (1x) : ¾" BSP Male
- Out going (2x) : ¾" BSP Female

Measurements & Weights : DWU – PF25SU40 drinking water unit

- Measurements W x D x H : 1360 x 700 x 830 cm
- Weight, empty (net) : approx. 96 kg
- Weight, full (full tank+salt) : approx 225 kg
- Power cable : 5 mtrs protective earth with 90° Shuko plug

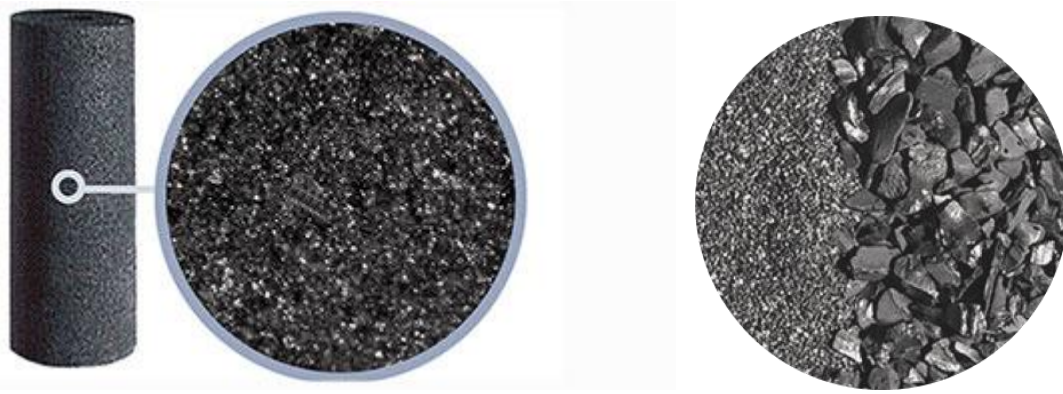
DFS > Dynamic Fixation of Silver



DFS technology is the primary method with the most active silver ionic form and makes the presence of silver safe in the AQUAPHOR filters without the possibility of the silver penetrating into the water (according to scientific studies of the last decades, therefore this technology is widely used). It has a greater antibacterial effect than other water filters that use conventional silver.

With DFS technology, AQUAPHOR water filters meet all European health and hygiene standards. The properties and uses of silver have been known since ancient times for the effectiveness it has, especially today with the expertise of science making water filters more effective and safer.

CFB > Carbon Fiber Block



CFB Membranous compact active coconut carbon

Carbon block is a technologically correct solution for water filters. Aquaphor has created the next generation of the carbon block, with the unique way of working with the rest of the materials and especially with AQUALEN solves many problems that exist in the simple carbon of most filters.

Usually the coal is used in powder, mixed with finely blended polyethylene and then fired. The firing process causes the small grains of coal (20 to 50 microns) to cling to each other.

The resulting effect has certain properties that can be adjusted during the production process. These properties remain constant throughout the life of the filter. Due to the fact that carbon particles adhere to each other, they practically also show negative effects.

So usually we have two grades of carbon: "effective" and "partially effective".

Effective carbon removes dissolved impurities, due to its high density, which is achieved by using smaller carbon grains.

Partially effective carbon atoms usually have a long lifetime due to the long distances between carbon grains. These distances are due to the lower filtration quality during water filtration.

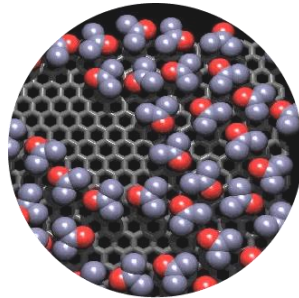
Aquaphor has found the solution to this dilemma, including AQUALEN, our carbon blocks are based on a mixture of granules and fibrous filtration ingredients

Aquaphor Carbon blocks with AQUALEN fibers

Aquaphor CF blocks do not have the drawbacks of the regular carbon blocks from the rest of the companies.

The benefits of using AQUALEN fibers:

AQUALEN not only filters heavy metals, but in conjunction with coal, which is highly absorbent, acts as an additional factor of smooth and rapid distribution for the flow of water. This is especially useful due to the dense structure of the carbon block and eliminates "dead zones" in the filter during the filtration process.



Isotrope adsorption matrix

IAM is a manufacturing technology where it creates a high density membrane in the filters, resulting in the effective absorption of harmful substances from the water during filtration through the filter. When Aqualen is mixed with the absorbent carbon granules, there is the effective effect of removing harmful substances from the water during the filtration.

IAM technology prevents the existence and creation of passages in the water filter, allowing you to create a uniform roll of water through the filter, without creating passageways through which the harmful elements can permeate through the water.

What does the presence of passages mean in practice?

A 'standard' filter has 2 performance weaknesses.

1. No grain can be less than 0.5 mc and that is because greater resistance prevents infiltration of water;
2. The water flow displaces the granules during filtration, causing the so-called channel diodes are created through which the harmful elements of water penetrate.

The IAM technology with Aqualen ensures a smooth distribution of water, without creating passages from the water flow.

Together with the activated carbon that absorbs all harmful elements from the water, we have the ideal result for the removal of all harmful elements from the water, even after an extensive amount of water filtration. Water filter manufacturers announcing that their filters reach less than 0.5 mc and contain only medicinal carbon, then that claim that they reach less than 0.5 mc is misleading.

It is scientifically known that carbon filters can reach up to 0.5mc, and only technologies with membranes and Ted fibers, at least to the already widespread technology already existing, can achieve a density of less than 0.5mc and provide a reliable result.

The negatives of certain technologies not included in the bleary carbon:

In water filters containing only carbon, or carbon with aragonite, there is no constant density and the presence of passages is why there may be the possibility of growth of microorganisms and especially bacteria.

Also the inefficiency of the technology of ceramic filters, where they reach up to 0.5 mc, do not retain chemical pollutants, as they are also vulnerable to the development of toxic elements after prolonged use and repeated cleaning.

AQUALEN™ ion exchange technique



Aqualen™ – a fibrous ion exchange chelating agent, which is an integral part of the proprietary drinking water filter blend created and developed by the AQUAPHOR Group exclusively for its domestic and commercial water filters.

Distinguishing physical qualities of Aqualen™ include its ability to irreversibly bind heavy metal ions such as lead, iron, mercury and radioactive isotopes.

The word "chelate" comes from the Greek word "chēlē", which means "a claw". In their chemical structure, the Aqualen™ functional groups resemble the claws. The Aqualen™ "claws" extract heavy metal ions from the water and keep them in a deadly grip.



The chemical structure of traditional sorbents

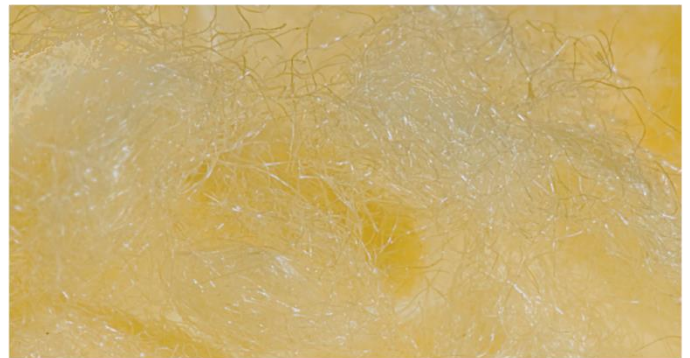


The chemical structure of Aqualen™

Another important aqualen™ quality is to spread the water evenly throughout the mixture, widening the contact area by 33 times compared to conventional ion exchange filters, thanks to the geometry of the material.



Conventional ion-exchange
Granule diameter: 700 microns
Surface area: 10 cm²/g



Aqualen™ ion-exchange fiber
Fiber diameter: 10 microns
Surface area: 1000 cm²/g

AQUALEN-3 anion exchange fiber features:

- a unique anion exchange fiber based on an anhydrous modified polyacrylonitrile polymer backbone with different nitrogen containing anion exchange and carbon groups on the surface.
- a unique combination of functional groups that give the fibers a better ability to adsorb harmful anionic and cationic contaminants from water with high selectivity.
- a high removal capacity for various iron and iron compounds and can be used as a superior pre-filtration material.

AND DOES YOUR OTHER PIPING NETWORK ALSO COMPLY WITH THE SAFETY REQUIREMENTS?



With our DWU drinking water treatment system you can produce high-quality, hygienic and safe drinking water! But what about your (existing) pipeline network, with dead-end branches from decommissioned tapping points? Or with the water storage in the drinking water tank(s) in the warm engine room?

When you bunker water from the shore in which only minute traces of the *Legionella pneumophila* Sero Group 1 are present, these can suddenly grow and break out under favorable conditions such as a warm ambient temperature!

One option is to have water samples taken regularly and to culture them in an external laboratory. But this test method takes a long time before the end result can be assessed, count on one and a half to two weeks and by then it may be too late if the test result is positive. Another disadvantage of the lab culture: it does not detect the VBNCs (Viable But Not Culturable), the not yet active bacteria. A PCR test method works faster but only detects DNA material from bacteria and is therefore much less reliable than a laboratory culture test.

H2Optimizer offers you a super-fast and reliable quick test on location: results in just 30 minutes and a free app to share a test result directly by email or text message with the responsible persons, who can then quickly make a decision for disinfection.

You can easily perform these tests yourself, or you can hire us and we will come to your test location.

Our solution: the **Hydrosense Rapid On-site Legionella Pneumophila SG1 test sets** and test kits.

hydrosense
smarter test, safer water



For more information, visit our website:

<https://www.h2optimizer.nl/home-en/hydrosense-rapid-legionella-test-kits/>