

# Universe

## DIY air humidification

The only whole-house air humidification system for  
DIY & professional use.





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## About Us

“Universe” is an affiliated brand of the Canadian company «Bühler-AHS» created especially for Northern Europe and Russia. The cold climate of these northern territories makes them one of the biggest prospective markets of air humidification. This is the key-factor why Buhler-AHS has decided to focus on the solutions for cold climate.

Buhler-AHS produces air humidification systems of direct fogging type since 2007. This is the equipment of high quality, which requires professional installation. New engineering solutions embodied in the Universe series have allowed the company to simplify the system, provide operational stability and at the same time high level of hygiene.

The main difference between Universe and basic Buhler-AHS system is the DIY (do it yourself) approach; it does not require any professional installation at all.

Localization of the system’s assembling decreases its price and allows also to meet various local requirements.



Universe is a unique system of direct fogging, which may be installed individually. You receive all the advantages offered by professional equipment of this type at affordable price. Extensive experience of designing, installing and assembling professional humidification equipment was employed during our system's development.

### Low humidity level as the main cause of respiratory diseases.

Current scientific studies point out that low temperature outdoors is not the main cause of respiratory diseases, whereas the indoor low humidity is.

### Humidity level in premises is below normal level.

First of all, it is really important to understand that humidity in the majority of apartments, houses and offices in the countries with low temperature hardly comes up to 20 % in winter, while the optimum humidity level for living spaces is supposed to be within 35 - 50 %. These recommendations are based on long-time medical and microbiological researches.

### Higher dust level in dry air!

There are particles and dust, containing viruses, bacteria and allergens which may persist in the air for a long time. In case of sufficient humidity level they just stick together and go down. Moreover, humid air ruins the structure of viruses, so that they lose their ability to impair human cells.

### Dry air may damage people's skin and mucosae.

Another fact is that dry air has bad impact on skin, more specifically, it increases water evaporation from mucosa and skin. Dryness of mucosa causes discomfort, ruins protective barriers of our body, consequently increasing our chances to get sick. Dry skin becomes less elastic, gets cracks and flakes.

### Parquet and furniture cracking caused by dry air.

Few are aware that parquet, doors and wooden furniture dries up under the influence of dry air. Human hair and pets' fur are being statically electrified.

## Universe is a direct fogging system

Miniature nozzles atomize water into fine fog directly inside rooms. Water is being deeply purified by the multi-stage purification system.

Fogging nozzles with artificial ruby inserts atomize water into droplets some 10-30 microns in diameter. Inevitably, such small drops quickly dissolve in the air leaving no scurf on the floor or on furniture. Before fogging, water passes through a multistage purification system, as a result of which it becomes free from microorganisms, organic compounds, salts.

Here are some advantages of Universe system:

### The highest level of hygiene

As you may know, water in Universe system passes through many stages of purification as a result of which disinfection takes place. After purification, water is directed through the hoses to nozzles, which spray it into each room directly. The inner layer of the hoses is made of Teflon®, and it is important because this material is one of the most slippery in the world, nothing sticks to it and it does not allow any bacteria growth. Such property makes the inner surface self-cleaning.

In the structure of Universe there are no places for growing microflora, as opposed to «air washers» and especially ultrasonic humidifiers. The fact is that even purified water in air washers and ultrasonic humidifiers becomes a «growth zone» for pathogenic flora when contacting air. Particular risk may be provoked by ultrasonic humidifiers, which produce fog directly from the vessel containing water.

### Efficiency

One spraying nozzle of Universe has a capacity within 0.6 to 1.2 l/h (connection of several nozzles and humidifying of several rooms is provided), whereas in contrast household humidifiers have smaller capacity - 0.25 - 0.6 l/h, so are supposed to humidify one small room only. Traditional devices (air washers) hardly increase humidity up to 30 %, because their efficiency decreases when humidity rises.

### High capacity range

Our system can maintain sufficient humidity both in small apartments and in big offices with hundreds of people.

### Alternative to air-conditioner

Air is cooled by water droplets' evaporation, temperature will be decreased by 2 - 3 degrees that allows using the system for cooling during hot summer season.

### May be installed into the finished interior

One more key advantage is that Universe can be installed into the finished interior and it does not require any special engineering fixture. Our system can be installed in standard flats, unlike professional steam systems, which should be mounted into vents.

### Dust suppression

Atomizing conditions have been chosen according to the optimum size of water droplets and as consequence for dust suppression and air purification.

### Simple maintenance

Universe requires only one or two technical maintenances per year, the rest of time it operates automatically, as opposed to steam humidifiers, which require professional maintenance once per month during cold seasons, or household humidifiers, which should be cleaned every week or even more often to avoid bacteria growth.

### No need to add water

You do not need to waste your time for manual filtration, cleaning the system or adding water. Universe is connected to water supply, so that water flow for humidification and washing is provided automatically.

### Energy efficiency

Potential energy accumulated by water during pump's action is used for atomizing. Power consumption ranges from 6 to 30 W/liter of water. Just for comparison steam humidifiers require 750 W/liter.

## Easy installation process

Installation process does not require from you any special expertise or tools.

### Nozzles are twisted in manually

No special tool is required for nozzles' installation. They are just screwed in by hand into threaded holes on the splitter.



### Instant hose's connection

Splitter may be instantly connected to the hose by QUICK connection. Connection and disconnection is made by hands with slight press.

### Splitter with nozzles is fixed on the bracket by magnets

Splitter can be attached to the bracket by magnets to the rear side with one click.



### Fast connection to water supply

It is not more complicated than connection of a simple household water filter under a sink in the kitchen.



### Fast & manual replacement of filters

Replacement of filter elements is provided manually in three steps.





## Why is air humidification so necessary?

First of all, it is important to know that the optimum air humidity for living spaces is supposed to be within 35 - 50 %. Usually, however, in the majority of apartments, houses and offices in countries with a cold climate the relative humidity barely comes up to 20 % during winter, while in rooms with good ventilation it is 10 - 15 % and even lower.

The volume of water, that can be absorbed by air increases as the temperature rises. For instance, at a temperature of -15 °C the air may absorb up to 1 gram of water per cubic meter, while at a temperature of +23 °C this quantity increases up to 23 grams of water per cubic meter. So, cold air coming from outdoors to the room becomes heated, but the water content remains former. Thus, in the example when it is -15 °C outdoors and +23 °C indoors, the relative humidity of incoming air becomes only 6 %. You can read more details at the section «Why is humidity level so low in winter?»

Modern scientific researches suggest low outdoor temperature is no a major cause of respiratory diseases, but the low indoor humidity is.

There are three main reasons of this:

1. There are particles and dust, containing viruses, bacteria, and allergens that may remain in a volume of air for a long time. If there is sufficient humidity level they just adhere to one another and fall down.
2. Furthermore, mucous membranes parch in dry air, since they must maintain a high humidity level of the inlet air going to the alveoli. This may overcome our body's protective barriers and increase the probability of infectious diseases. In addition, phlegm with pathogens is removed more slowly, prolonging illness.

3. Moreover, humid air damages the structure of viruses and they lose their ability to damage human cells. In the dry air they may exist for hours until invading our organisms.

Finally, this is especially dangerous for children under one year, whose immune system has not formed yet.

Also, dry air has a bad influence on the skin and hair condition. More specifically, the skin of hands and lip and facial skin flakes and becomes less elastic. Hair dries, loses its luster, becomes more brittle, and also becomes electrostatically charged.

When humidity is at 35 % the surface of objects is covered by a thin film of water and electrostatic charge is discharged. Human hair, pets' fur, interior furnishings, wool, and synthetic clothes are not electrified.

Dry air causes water evaporation from objects to increase. Wooden doors, furniture, parquet, and musical instruments are unevenly shrunk which leads to their deformation.

Furniture manufacturers recommend maintaining a 40 - 60 % humidity level.

Another important fact is that the air humidification for wooden houses protects it from cracks and structural skewness. Valuable paintings and furs can be damaged when stored under low humidity.

## Why is humidity so low in winter?

To begin with, there are two physical values that characterize the air humidification:

Absolute humidity is the mass of water vapor contained in a cubic meter of air and measured in grams per kilogram of air. One cubic meter of air is equal to 1.2 kg.

Relative humidity is the ratio of water vapor mass contained in one cubic meter of air to the highest possible mass of contained water under current temperature. It is measured in percentage.

We feel the relative humidity because it determines the rate of water evaporation from skin surfaces and from objects.

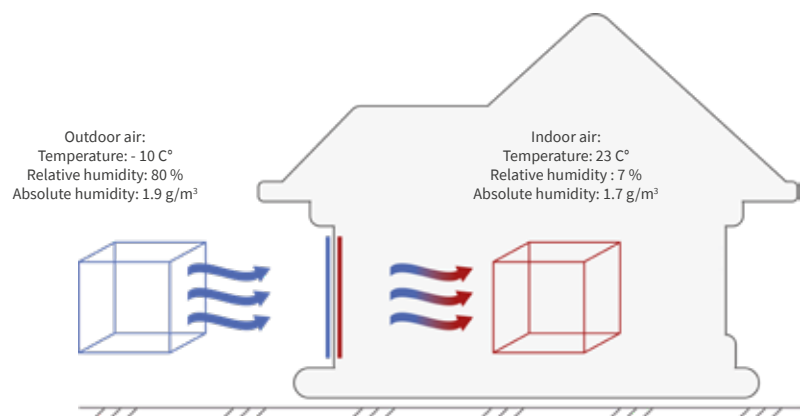
When the temperature rises, the maximum water content that can be absorbed by the air will be also significantly increased. Below you may find the temperature and corresponding maximum absolute humidity:

- 25 °C	0.6 g/m <sup>3</sup>
- 10 °C	2.4 g/m <sup>3</sup>
0 °C	5.2 g/m <sup>3</sup>
+ 10 °C	10.1 g/m <sup>3</sup>
+ 23 °C	23.1 g/m <sup>3</sup>

Let us consider the situation when the outdoor temperature is -10 °C, relative outdoor humidity is 80 %, so the absolute humidity will be 1.9 g/m<sup>3</sup> of air. This air gets into a building through the ventilation system and through the leakiness of the windows. In this case it is heated, keeping the same water content, so its relative humidity is only 8 % at +23 °C.

Actually, there are always additional «moisture sources» such as: people, kitchens, bathrooms. Because of this, typical air humidity in winter is 15 % and even less if there is a forced ventilation installed in a house.

At such humidity level water evaporates intensively from surfaces and we feel dryness of the air through inhalation and by our skin.



# Application

We have already mentioned that the optimum humidity level for us is in the range of 35 - 60 %. But for very cold weather we recommend setting the target humidity not higher than 35 % to avoid weeping of the windows. In countries with low temperature, air humidity rarely rises the level of 20 %, leading to rapid evaporation of water from the surface of our skin, mucosae and objects. In well ventilated rooms relative humidity may drop below 10 %, which, by the way, is two times lower than in the driest desert.

## Air humidification for home

Let us consider the advantages of air humidification:

- Human comfort and wellness
- Reduced incidence of respiratory infections, faster recovery from illness
- The morbidity rate among children also decreases and they easily get through diseases

In case of insufficient humidification, we may feel the dryness of air when we breathe. The truth is that airways moisten the air entering the alveoli and all the moisture is collected from the surfaces of nasal, mouth, throat and bronchial mucosae. Increased intensity of evaporation from the surface of the nasopharynx leads to its drying and even to the dysfunction of the mucosae. Thus, the protective barriers of the body that protect us against viruses, bacteria, allergens, and other air pollutants are violated. It is especially dangerous for small children whose immune systems have not yet formed. Moreover, from the over-dried surface of nasopharynx mucosae phlegm is separated worse, it leads to the aggravation of a disease progress and to deterioration of people state of health suffering from allergies.

- Solution for dry skin, cracked lips and brittle hair

Facial skin, hands and lip skin usually peels, cracks, and becomes less elastic. Hair becomes more brittle and split, loses its shine and also becomes electrostatically charged.

- Air purification

You should also know that particles containing viruses, bacteria, and allergens, as well as dust can exist for hours in dry airspace. When the humidity level is adequate they just stick one to another and precipitate. In humidification systems using the direct fogging method, the size of the droplets is matched for the most effective air purification.

- Preservation of wooden furniture, parquet and doors.

Dry air also causes increased of water evaporation from objects. Wooden furniture, doors, parquet floors, and music instruments are unevenly decreased in size and are deformed. Paintings and furs are also damaged by storage in dry air.

- No static electricity

Human hair, pets' fur, clothes and interior features made of silk, wool and synthetic materials will not be electrostatically charged when relative humidity is more than 35 %.

- Houseplants grow better

As mentioned, humidity rarely exceeds 20 % in winter. Only cacti and other desert plants grow well under such conditions. Sufficient humidity is necessary for plants from other climatic zones.

Below there are some additional advantages of fogging systems:

- Autonomous operation
- Maximum hygiene
- Low power consumption
- Ability of hidden installation in a finished interior
- Ability to use for cooling purposes
- Ability to humidify several rooms
- Quiet operation

## Air humidification in offices

Let us consider the advantages given by air humidification in offices:

- Reduced transmission of influenza or other acute respiratory diseases' transmission.

Scientific reaserches point out that the increase of morbidity in the cold season is related to a low indoor humidity level, but not to low outdoor temperature. This is determined by three factors:

1. First of all, when the humidity level is sufficient particles containing viruses and bacteria just stick one to another and precipitate. In dry airspace they thrive for hours.
2. The structure of viruses is destroyed in adequate air humidity, so they lose their ability to damage human cells.
3. Drying of mucous membranes leads to the violation of the protective barriers in the human body.

- Protection against loss of voice

A low humidity level causes the loss of people's voices whose job requires regular phone conversations.

- Less absences of employees because of illness
- Comfortable working environment, better health of personnel
- Less eye irritation

Dry air leads to the increase of water evaporation from eyes, they redden and become irritated.

- Less dust content in the airspace
- No static electricity
- More stable operation of printing equipment

Dry air may lead to paper shrinkage, which can lead to malfunction of printing equipment.

Additional advantages of fogging systems:

- Maximum hygiene, protection against growth of microorganisms, including legionella
- The highest energy efficiency and reduced service costs
- The system does not require regular maintenance
- Ability to use the system for cooling purpose
- Significant distance from the central equipment to humidification zones
- Automatic operation
- Ability of hidden installation

## Air humidification in kindergartens and schools

Here are the most important benefits given by air humidification:

- Reduction of the influenza pathophoresis and other acute respiratory infections

As mentioned above, scientific researches show that increased morbidity in a cold season is related to a low indoor humidity level, but not to low outdoor temperature.

- Air purification

Dust and particles containing viruses, bacteria, and allergens may float in dry air for hours because an electrostatic charge has accumulated on their surface. Under conditions of 35 % RH level air begins to conduct electricity, as the result the charge runs off the particles, which then stick to each other and precipitate to the floor.

- A more comfortable environment

Dry air leads to cracking of the skin, particularly on the hands and lips, as well as irritation of the eyes.

There are also some additional advantages of a fogging system:

- Protection against the growth of microorganisms, including legionella.
- Lower power consumption
- Lower service costs
- Simplicity of sanitary control
- Finally, what is the most significant, inaccessibility of the equipment to children

## Air humidification in museums

Let us consider the advantages given by air humidification in museums:

- First and foremost, exhibit items will not be deformed and cracked because of dryness.

Dry air causes increased water evaporation from objects. This is especially important when storing antiques and expensive furniture. One more important thing is that wood, canvas and parchment corrupts in dry air, becoming brittle and dehiscent, doing irreparable damage. Wooden furniture, doors, stairways, banisters, and parquet, as well as picture frames and musical instruments, unevenly shrink and deform. Therefore, it is recommended to maintain 50 - 60 % humidity in museums.

- Paint will not be flaked from pictures and decorative elements will not detach from items.

Low humidity level leads to the caducity of glue seams and flaking of the decorative elements. Moreover, paint may flake from the pictures.

- A material's natural aging process slows down if there are no regular fluctuations of humidity.

The usual factor of this process is perceptible humidity changes. It is important to understand, that even frequent or high amplitude fluctuations are even more dangerous than reduced or increased humidity. As many of materials are able to absorb and release humidity easily, significant daily fluctuations lead to frequent changes of swelling and compression. The main consequence of such changes is the deformation of the material (warping, wrinkling, folding), flaking of paint, sapping of the surface layer. Frequent fluctuations in humidity of more than 5 % are dangerous for showpieces and furniture.

## Air humidification in hospitals

During cold seasons the indoor air humidity level is about 10 - 20%, causing an increase of the evaporation rate from surfaces, including skin and nasopharynx. That is why we recommend using air handling systems that maintain the required level of temperature and humidity, particularly in pulmonary departments. As a reminder, the optimum humidity level is within 35 - 60 %.

What is more important, dry air is especially dangerous for people with reduced immunity and small children whose immune system has not been formed yet.

Here are the benefits given by air humidification:

- Higher resistance to viral diseases

Dry air leads to drying of mucous membranes, by reducing the protective barriers of the body, whereas, when the humidity is between 35 - 60 % the viral envelope is breached and loses its ability to damage cells.

- Faster healing process
- Air purification

It is a well-known fact, that when the humidity level is adequate, dust and particles containing viruses just stick one to another and precipitate. In dry air they thrive in the airspace for many hours.

- Health of staff and patients

Below you may find some additional benefits:

- Protection against growth of micro-organisms, incl. legionella
- Lower power consumption
- Lower service costs
- Simplicity of sanitary control
- Hidden installation of components

## Air humidification in libraries

Dust is one of most aggressive factors in libraries. It can thrive for many hours in dry airspace under the influence of the electrostatic charge accumulating on it. At 35 % humidity, air begins to conduct electricity, so that charge flows off the particles, allowing them to adhere and precipitate. In our humidification systems the size of drops is matched for the most effective air purification.

- Growth of microorganisms is inhibited

It should be mentioned first that the duration of dust particles' thriving in air depends on its form and size. Many microorganisms and fungi settle on the dust particles. They are then transported by the dust, getting on books and documents, developing there and spoiling their look. Therefore, there is a direct dependence between keeping objects dusted and microorganisms content.

- Slow deterioration of books

Mineral dust, especially soot, and whitewash, are dangerous because of their abrasive action. Furthermore, dust hardens when it remains a long time on books (it clots); then it is more difficult to remove.

- Less harm to people because of the dust sublimation from lighting fixtures

It is important to know that the total dust content usually increases at the high temperature of the heating elements. Dust that has settled on lightning and heating elements is heated up; at 80 °C a dry sublimation of organic dust occurs, which is hazardous for people.

## Comparison of air humidification systems

Main types of humidifiers:

Humidification systems	Ultrasonic		Steam generators		Traditional		Direct fogging	
	Residential	Professional, in-duct type	Electric, in-duct type	Household, floor standing	Disc "Air washers"	Hygroscopic, in-duct type	Professional	Universe
Microbiological safety, hygiene	--	-	+	++	-	--	++	++
Comfort of use								
No need to add water	-	+	+	--	-	+	+	+
Quiet operation	+	+	++	--	-	++	+	+
Effect of adiabatic cooling	+	-	--	--	+	+	++	++
Operation								
Energy efficiency	+	+	--	--	+	+	++	++
Capability to use common tap water (incl. humidifier's filters)	--	--	+	+	+	-	+	+
Efficiency								
Performance	-	+	+	-	--	-	++	++
Humidification of several rooms	-	+	+	-	-	+	+	+
Installation								
No need for professional installation	++	-	--	++	+	--	--	+
Fitting into the finished interior	++	--	--	++	+	--	+	+
Equipment can be hidden	--	+	+	--	--	+	++	+
Possibility of the main equipment's remote location from the fogging areas	--	+	+	--	--	+	++	++
Maintenance								
Service life	-	+	++	+	-	+	++	++
Complex and frequent maintenance is not required	+	+	-	+	+	-	+	+
No need for regular cleaning	--	-	--	--	-	--	++	++
Price	\$	\$\$\$	\$\$	\$	\$	\$\$	\$\$\$	\$\$

## Ultrasonic humidifiers

First of all, this is the cheapest and most popular type of air humidifiers. The main part of such a humidifier is a vessel with water under the bottom of which a piezoelectric transducer is installed. It vibrates at a high frequency (up to 1.65 million times per second). The vibration parameters are chosen in such a way that transverse waves are formed on the water surface, on the crests of which droplets (around 5 micron) tear off. Droplets are carried away from the surface by air flow, which is blown by a fan.

The entire content of the vessel, including bacteria and salts goes into the air. In case of using undistilled water for humidification, the stubborn salt scurf will appear on the surface of objects.

Unfortunately, distilled water contacting the air becomes a spot of pathogenic microflora which enter the air together along with the «steam».

All ultrasonic humidifiers may be divided into household and professional ones. The consumer properties of both types completely differ, so let us discuss about them separately.

### Household ultrasonic humidifiers

This type of humidifier is designed to humidify sufficiently only one room. Technical information for one of such device indicates that it may serve a room up to 70 m<sup>2</sup> and its total performance is 600 ml/hour. The calculations show that in the climatic conditions of Northern Europe performance is optimal only for an area of 30 m<sup>2</sup>.

#### Advantages:

- Cheap
- Almost noiseless
- Low power consumption

#### Disadvantages:

- Growth of microflora in the water vessel
- Regular (every 3 days or more often) washing is required for restriction of the microflora's growth
- Requires adding of water
- Deionized (distilled) water is required; otherwise the stubborn white scurf of salts forms
- Installation in every room is required

### Professional ultrasonic humidifiers, installed into ventilation systems

#### Advantages:

- Low power consumption
- Possibility of hidden installation
- Low noise

#### Disadvantages

- Pre-demineralization of water is required
- Danger of microflora growth on the inner surfaces of HVAC system
- Disinfection of an entire HVAC system 1 - 2 times per year is required
- Only professional installation is possible during construction and finishing works

## Steam generators

In most of steam generators an external heat source (gas or electricity) is used to boil water and form vapor. Obviously it leads to high power consumption.

Tap water is used in systems with submersible electrodes. Such water contains dissolved salts, so it conducts electricity. When voltage is applied to submerged electrodes water starts boiling. Heating elements operating by gas or electricity are also used for boiling. Steam is released to the vent system or directly into the room.

### Electric steam generators with steam outlet to air ducts

#### Advantages:

- Water disinfection, hygiene and microbiological safety because of boiling
- Operation with tap water

#### Disadvantages:

- Power consumption from 750 W/l of water - it's very high!
- Frequent maintenance (once per month in the case of raw water use)
- Because of condensation microflora grows at air duct walls, then it enters the room

### Electric steam generators with steam outlet to rooms (floor standing)

#### Advantages:

- Use of tap water is possible (when using deionized water, service will be rarely required)
- Microorganisms are destroyed by water boiling

#### Disadvantages:

- Steam is supplied only in the one room where the system is installed
- Permanent noise is produced by boiling water
- High power consumption
- In case of tap water use - frequent maintenance and cleaning is required
- Outlet of hot steam may be dangerous

## Traditional humidifiers

In traditional humidification systems cold evaporation of water is used, water evaporates from the surface of wet discs or from hygroscopic spongy material. Blowing fan provides an output of humidified air to a room.

### Floor standing disc humidifiers or «air washers»

#### Advantages:

Low price

Professional installation is not required

Air purification (dust and allergens are partially trapped on discs or on the sponge material)

Overhumidifying is impossible because performance decreases while humidity is increased

Tap water may be used

#### Disadvantages:

Low efficiency, which also decreases further when humidity rises. Such systems hardly cannot increase relative humidity much above 30 %

Water must be added regularly

Even when using pre-treated water, microorganisms also grow when water contacts the air. This type of devices should be cleaned every 3 days to avoid a biofilm growth

The air is humidified only in the specific room, where the system is installed, the same as for household ultrasonic humidifiers

Fan's noise. During «night mode» operation such devices are virtually useless

### Channel humidifiers based on hygroscopic material

#### Advantages:

Hidden installation

Using of tap water is acceptable

Adiabatic cooling during summer season

No necessity to add water

#### Disadvantages:

Growth of microorganisms on the hygroscopic material and in air ducts with subsequent introduction to a room's airspace

Regular cleaning and disinfection of hygroscopic material is required

Performance decreases when humidity rises

Forced ventilation is required

Professional installation is required

## Universe - the system of direct fine fogging type

Atomizing nozzles with the artificial ruby inserts pulverize water into droplets to a size of 10 - 30 microns. Such small drops quickly dissolve in the air leaving no traces on the floor or on furniture. However, the droplets produced by our system are larger than those produced by ultrasonic systems, that is significantly enhancing the efficiency of air purification and dust suppression. Before atomization, water passes through a multistage purification system, as the result of which water is purified of microorganisms, organic compounds, and salts.

#### Advantages:

##### The highest level of hygiene

As it was already mentioned, water in our system passes five stages of purification and thereby becomes sterile. After purification, the water is directed through a hose to the nozzles, which atomize it into rooms. The inner layer of the hoses is made of Teflon®, which is very important because this material is one of most gliding materials in the world, nothing sticks to it. This property makes the inner surface self-cleaning. Universe regularly washes inner elements of the central unit and hoses to prevent the appearance of stagnant zones. As a result, full microbiological safety is achieved, including full protection from legionella, which may dwell in tap water and cause severe pneumonia while inhaling the air.

##### Efficiency

In Universe system one fogging nozzle has a capacity from 0.6 to 1.2 l/h, and up to 5 nozzles may be connected to the basic system (in an extended version with up to 15 nozzles), delivering water to several rooms. Therefore the serviced area ranges from 10 to 900 m².

##### No need to add water

You do not need to waste your time with manual filtration, system cleaning, or adding of water. Universe is connected to the water supply, so water flow for humidification and washing is carried out automatically.

##### Alternative to air-conditioner

Air is cooled by evaporation of water droplets, air temperature will be lowered by 2 - 3 degrees.

##### Light effect of ionization

Near seashores, mountain rivers and waterfalls drops detach from the surface of water, causing ionization of the air. A similar process is caused by fine water atomization. Subjectively we perceive this as freshness, whereas air ionization has therapeutic effect, as at seaside.

##### Possibility of installation in a finished interior

One more advantage is rather important - Universe may be installed in the finished interior and it does not require any special engineering fixtures. Our system can be installed in standard apartments, unlike professional steam systems, which must be installed into air ducts.

##### Possibility of equipment removal from serviced areas

The central unit may be located in any auxiliary room that allows connection to a water supply, drainage, and electric supply. Only fogging nozzles are directed into rooms.

## Dust suppression

Atomizing parameters were chosen according to optimal size of water droplets and as consequence for dust suppression and air purification.

## Simple servicing

Universe requires only one or two service maintenances per year; the rest of the time it operates automatically.

## Energy efficiency

Potential energy, accumulated by water during the pump's action is used for atomization. Power consumption ranges from 6 to 30 watts per liter of atomizing water per hour. Just for comparison: steam humidifiers require 750 watts per liter of atomizing water per hour.

## High capacity's range

Our system can maintain sufficient humidity both in small apartments and in large offices with hundreds of people.

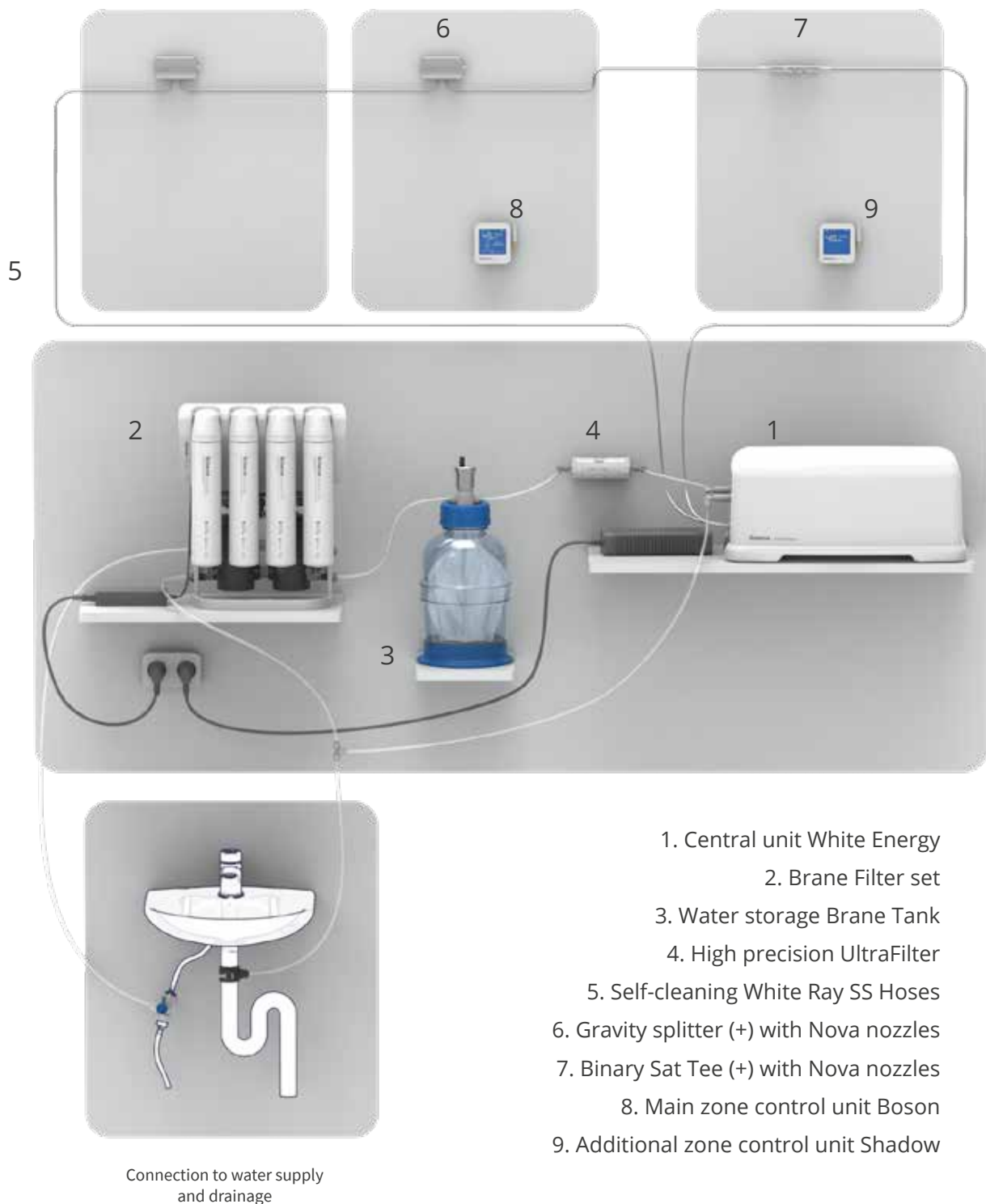
## Disadvantages:

High price

The central unit requires connection to water supply, drainage, and an electric supply.



## Operating principle of Universe air-humification system





# System's components

## 1. Central unit White Energy

It generates pressure in the hoses and directs water to fogging nozzles. White Energy can be installed in any room with available connection to water supply, drainage and electricity.

## 2. Brane Filter set

Consists of the following stages:

- Carbon filter removes chloride, organic and inorganic compounds from water (included in Brane Filter and as an option for Brane Extra).
- Ultrafiltration membrane does not let particles more than 0.1 micron in diameter to pass. This protects reverse osmosis membrane from microorganisms.
- Double reverse osmosis filtration purifies water from bacteria, viruses, organic compounds, and further more it's salts rejection is over 99 %, it is higher than the requirements to distilled water.

## 3. Water storage Brane Tank

Accumulates water purified by Brane Filter, because reverse osmosis filtration goes quite slowly.

## 4. High precision UltraFilter

This filter is installed into the pipeline before White Energy unit, it traps bacteria and viruses, which remained in the systems's elements after installation or got into water because of unsatisfactory filtration (if standard Brane Filter is not used).

UltraFilter is included in the supply package of central unit, it should be replaced annually or according to the pollution level.

*Attention! If 2 or more Brane Filter units are connected in parallel the Brane UV Filter sterilizer must be installed instead of UltraFilters.*

## 5. Self-cleaning White Ray SS Hoses

White Ray consists of two layers. Inner one is made of Teflon®, this material is one of the most slippery materials in the world, and nothing can stick to it. This property makes the hoses self-cleaning, biofilms do not appear at all. Even after long system's downtime, microorganisms will be washed out during standard washing process. This property is unobtainable for other types of inner layers. Armour & covering layers are made of AISI304 stainless steel. Due to high tensile strength, it can withstand 4 times bigger nominal pressure and 15 times bigger burst pressure. At the same time, it is flexible and elastic. This hose gives high resistance to fractures and external mechanical damages.

## 6. Gravity (+) splitter with Nova nozzles

It atomizes water directly into room. Up to 3 nozzles may be installed into one Gravity splitter, which corresponds to the following capacity: 1.2, 2.4 or 3.6 l/h at maximum pressure in the hose. Nozzle's head contains ruby - one of the most hard crystals. That provides the highest durability of nozzles and forming optimum diameter of droplets 15 - 40 micron.

## 7. Binary Sat (+) tee with Nova nozzle

Alternative way for water atomization, which is usually used for hidden type of installation. There is an UNC thread connection at the face surface, in which atomizing nozzle or Tunnel extender should be screwed. Therefore, one nozzle may be installed into the splitter, which corresponds to 1.2 l/h capacity under maximum pressure in a hose.

## 8. Main zone control unit

It is a wireless precise electronic sensor with a display, showing desired and current humidity levels. Desired humidity level may be set at the display by a user.

## 9. Additional zone control unit

It is a wireless sensor, used only as an addition to the main control unit Boson. May be installed into rooms with fogging nozzles and help to avoid excessive humidification.

# Brane Filter

Double Reverse Osmosis filter, 6 l/h

Dimensions: 340 mm x 190 mm x 400 mm (LxWxH)

Weight (w/o water): 5200 g

Connections: 4 x 1/4" John Guest® female

Power adapter: 100 - 240VAC, 50/60Hz

Energy input: 60 W

Input pressure: 2.5 - 4 bar

Nominal water rate: 6 l/h

Microfiltration: 1 - 5 micron

Ultrafiltration: 0.1 micron

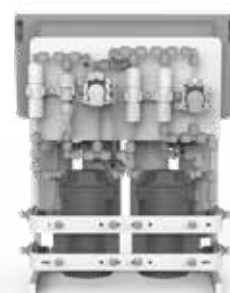
Adsorption of chlorine, output: 32 000 liters or 6 months,

water resource: under 0.3 ppm Cl in output water

Material: painted steel, plastic



side view



rear view

## Description:

Brane Filter – a complex filter for water purification with a **two-step** reverse osmosis system.

The main unit of RO water purification system - a semi-permeable membrane, that allows only water molecules to pass. While supplying of polluted water to membrane purified water passes it under pressure, and polluter is holded.

The second membrane of Brane Filter purifies water once again after the first one. Each membrane is equipped with an individual noiseless pump. The two stage filtration purifies water to the level, which is unobtainable for traditional RO systems. It is especially important to purify water from silicic acids, as they hardly removed from water and form white scurf on the surfaces.

As RO membranes are contamination-sensitive, therefore water goes through two treatment stages:

- Modified absorbent carbon in the form of filaments purifies water from mechanical pollution of 1 - 5 micron size, chlorine and different organic contaminants.
- Ultrafiltration membrane does not let particles of more than 0.1 micron size pass. This protects RO membrane from micro-organisms.

Tubes can be connected manually without using any instruments with a slight press by John Guest® type fittings. Connection sets for drainage and water-supply come standard with supply package. Brane Filter should be installed on the horizontal and stable surface.

## Advantages:

Unique two-stage reverse osmosis cleaning circuit

Water purification level is more higher than household analogs

Fast & easy connection of water tubes by John Guest® fittings

Fast replacement of cartridges without using any instruments

Long life of adsorbitive microcarbon cartridge

Traps more than 99.999 % of micro-organisms

Food grade filter's material



## Supply kit:

1. Filter base for 4 cartridges for installation on a shelf or on a floor
2. Microcarbon cartridge
3. Ultrafiltration cartridge
4. RO cartridges - 2 pcs
5. Power adapter
6. Kit for water supply
7. Kit for drainage connection
8. Fittings set and connection tube
9. Tube cutter

Attention! If 2 or more Brane Filter units are connected in parallel the Brane UV Filter sterilizer must be installed instead of UltraFilters.



## Replacement cartridges:

Article | pcs for replacement

## Brane Carb | 1 pc

Cartridge for premechanical and adsorptive purification

Dimensions: 60 mm x 282 mm (ØxL)  
Material: food grade plastic  
Microfiltration: 1 - 5 micron



## Brane Ultra | 1 pc

Cartridge for ultrafiltration purification

Dimensions: 60 mm x 282 mm (ØxL)  
Material: food grade plastic  
Ultrafiltration: 0.1 micron



## Brane RO 100 | 2 pcs

RO cartridge 100GPD

Dimensions: 60 mm x 282 mm (ØxL)  
Material: food grade plastic  
Microfiltration: 0.001 micron





# Brane Tank

Transparent water tank

Dimensions: 200 mm x 440 mm (ØxH)

Weight: 900 g

Connections: 1/4" John Guest® female

Volume: 5.8 l

Air inlet pressure: 0.6 bar

Material: food grade plastic

## Description:

Brane Tank – an accumulator for water, purified by the Brane Filter. Reverse osmosis filtration is processed slowly, that is why the system collects water for correct operation.

Transparency makes it easier to control operation and purity visually. In spite of traditional accumulators biofilms do not appear at the inner surface because of an anti-bacterial coverage.

The Brane Tank is connected with feeding hose manually by instant John Guest® type fittings with a slight effort without using instruments.

## Advantages:

Transparency makes it easier of visual control for operation and purity

Anti-bacterial coverage of surface contacting water

Easy replacement of tinner bag (if necessary)

## Supply kit:

1. Antibacterial water tank (accumulator)
2. Fittings and connection tube





# Brane Extra

Additional filter unit, 6 l/h

Dimensions (w/o cartridges): 125 mm x 90 mm x 120 mm (LxWxH)

Weight (w/o cartridges): 450 g

Connections: 2 x 1/4" John Guest® female

Nominal water rate: 6 l/h

Material: plastic



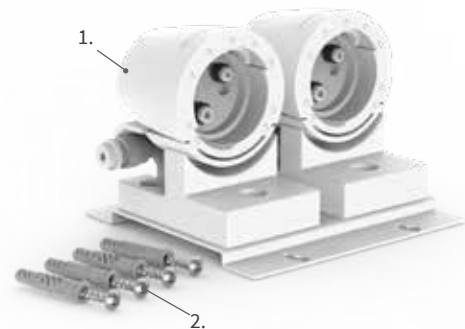
side view  
with connected  
Brane Sedi and Brane Carb cartridges



front view  
with connected  
Brane Sedi and Brane Carb cartridges

## Supply kit:

1. Wall base for 2 cartridges
2. Mounting kit



## Description:

Brane Extra – a wall mount base which is designed for the installation of two additional cartridges. Cartridges are purchased separately.

### Application of Brane Extra:

A preliminary unit for the Brane Filter is used in case of a high level of sediment and chlorine contaminants. Brane Sedi and Carb cartridges are connected in series.

For replacement one should turn it manually with a slight effort. Do not shut off the water supply, it is blocked automatically.

Tubes are connected manually with a slight pressure by John Guest® type fittings without using tools.

## Advantages:

Fast connection of John Guest® type water tubes

Quick replacement of cartridges without using special tools

## Brane String

Tube for water supply and drainage connection  
1/4"



Outer diameter: 6.35 mm

Inner diameter: 4.35 mm

Min. bending radius: 20 mm

Material: Polyurethane 98ShA

### Description:

A flexible transparent tube – Brane String is made of special break-resistant polyurethane.

The Brane String provides connection from the water supply to the Brane Filter and further to the UltraFilter. It is recommended to use FEPTUBE - 1/4" after the UltraFilter. The Brane String is also used for the drainage connection.

A standard quantity of Brane String is included to the supply package of the Brane Filter and the White Energy. In case of long communications, an additional quantity of Brane String is required.

The tube is supposed to be attached directly to the instant John Guest® type fittings.

### Supply kit:

1. Flexible connection tube 1/4"

### Advantages:

Resistance to breakings

Elasticity and flexibility

Transparency allows easier visual control for operation and purity

High quality polyurethane

## Brane Sedi

Cartridge for preliminary mechanical water  
purification



Dimensions: 60 mm x 282 mm (ØxL)

Weight (w/o water): 340 g

Microfiltration: 1 - 5 micron

Material: food grade plastic

### Description:

Brane Sedi – a cartridge for mechanical purification of water; its filtration capability is 1 ... 5 micron. It is used as the first stage of Brane Extra for preliminary water purification from sediment contaminants. High level of contaminant capacity.

For replacement one should turn it manually with a slight effort. Do not shut off water supply, it is blocked automatically.

### Supply kit:

1. Microfiltration cartridge

### Advantages:

Quick replacement of cartridges w/o using special tools

High contaminant capacity



## Description:

Brane Carb – a cartridge with modified active carbon in the form of fibres. It purifies water of mechanical impurities of 1 - 5 micron size, adsorbing chlorine and organic contaminants. The Brane Carb is installed as the second stage of the Brane Extra for preliminary water purification and as the first stage of the Brane Filter for mechanical and adsorption purification. High chlorine capacity.

For replacement one should turn it manually with a slight effort. Do not shut off the water supply, it is blocked automatically.



## Description:

Brane Ultra - an ultrafiltration unit of non pass-through filtration. It is installed in the Brane Filter before the reverse osmosis membranes and provides protection against submicron impurities, which may decrease the life time of reverse osmosis. The Ultrafilter traps bacteria and most of viruses contained in tap water. It maintains the required sanitary level of purified water and extends the durability of Reverse Osmosis membranes.

For replacement one should turn it manually with a slight effort. Do not shut off the water supply, it is blocked automatically.

# Brane Carb

Cartridge for premechanical and adsorptive purification

Dimensions: 60 mm x 282 mm (ØxL)

Weight (w/o water): 360 g

Microfiltration: 1 - 5 micron

Adsorption of chlorine, output 32 000 liters or 6 months,  
water resource: under 0.3 ppm Cl in output water

Material: food grade plastic

## Supply kit:

1. Cartridge for premechanical and adsorptive purification

## Advantages:

- Quick replacement of cartridges w/o using special tools
- High chlorine capacity

# Brane Ultra

Cartridge for ultrafiltration purification

Dimensions: 60 mm x 282 mm (ØxL)

Weight (w/o water): 320 g

Ultrafiltration: 0.1 micron

Material: food grade plastic

## Supply kit:

1. Cartridge for ultrafiltration purification for protection of RO membranes

## Advantages:

- Quick replacement of cartridges w/o using special tools



## Brane RO 100

Reverse Osmosis cartridge, 100 GPD

Dimensions: 60 mm x 282 mm (ØxL)

Weight (w/o water): 440 g

Salt rejection: 96 - 98 %

Nominal capacity: 100 GPD

Material: food grade plastic

### Description:

Brane RO 100 – a cartridge with reverse osmosis membrane. A reverse osmosis membrane - is the main element of the Brane Filter; it purifies water at the molecular level, trapping up to 100 % of bacteria and viruses, mechanical impurities, colloids and up to 97 % of salts.

It is installed as the third and fourth stages of the Brane Filter. The serial connections of the two RO membranes purify water up to a level, exceeding the requirements for distilled water (salt rejection exceeds 99 %).

For the replacement of Brane 100, disconnect John Guest® type connector and turn the cartridge manually with a slight effort. During replacement, shut off the water supply to prevent leakages.

### Supply kit:

1. RO cartridge for molecular purification

### Advantages:

Quick replacement of cartridges w/o using special tools

High salt rejection level under high capacity



# Brane UV Filter

## Optional ultraviolet sterilizer



*Attention! If 2 or more Brane Filter units are connected in parallel the Brane UV Filter sterilizer must be installed instead of UltraFilters.*

## Description:

Brane UV Filter is a flow ultraviolet water sterilizer with the body made of polished AISI316 stainless steel. The sterilizer is equipped with an ultraviolet lamp.

The lamp may be replaced without disconnecting the sterilizer because the inner cylinder is made of quartz glass with a polycarbonate cap. The sterilizer destroys bacteria and viruses. It provides the highest level of sanitary hygiene and increases the life time of the ultrafiltration membrane, which can become clogged with microorganisms after a while. Ultraviolet radiation destroys the DNA and RNA of microorganisms, leading to their total destruction.

The Brane UV Filter is connected to a water supply by instant fittings of John Guest® type. Straight and elbow fittings come standard with the supply kit. Water tubes can be easily connected by hand with a slight pressure without using any tools.

The sterilizer is fixed by two plastic clips, which are mounted to the wall or horizontal surface by self-tapping screws or an adhesive tape.

Electric power supplies by a 230 VAC adapter.

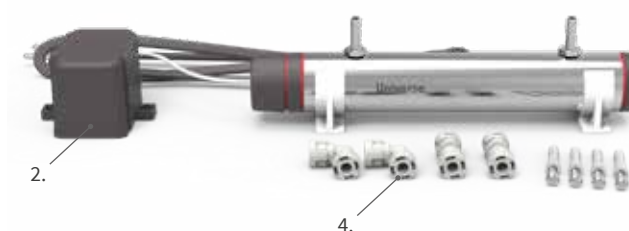
## Advantages:

- Fast tube's connection of John Guest® type
- Instant mounting by clips
- Fast replacement of the lamp
- Destroys more than 99.999 % of microorganisms
- Does not pollute water, does not change its content
- High quality AISI316 stainless steel
- Sealing made of silicone resistant to ultraviolet

Dimensions:	40 mm x 240 mm (ØxL)
Weight (w/o water):	450 g
Connections:	2 x 1/4" John Guest® female
Power adapter:	100 - 240VAC, 50/60Hz
Energy input:	8 W
Average length of UV radiation wave:	253.7 nm
Nominal water rate:	6 l/h
Time of UV water radiation:	min. 15 seconds
UV radiation dose:	min. 100 µJ/cm²
UV lamp's life time:	9000 hours
Material:	AISI316 stainless steel, quartz glass, special silicone, polycarbonate

## Supply kit:

1. Sterilizer equipped with the installed UV lamp
2. Power adapter
3. Mounting clips - 2 pcs
4. Connection fittings
5. Mounting kit



# UltraFilter

Replacement precise ultrafilter for  
White Energy



Dimensions: 48 mm x 155 mm (ØxL)

Weight: 70 g

Connections: 2 x 1/4" John Guest® male

Filtration: 0.1 - 0.2 micron

Material: ruggedized plastic

## Description:

UltraFilter – a flow-through ultrafilter. It is installed into the inlet water pipeline before White Energy. It is included into the supply package of the central unit, it should be replaced annually or according to the level of clogging.

The UltraFilter physically traps bacteria and viruses that have remained in the system's elements after installation or have gotten into the water because of unsatisfactory filtration (if the standard Brane Filter is not used). It maintains high level of sanitary hygiene and increases the life-time of the central unit's pump.

The ultrafiltration membrane's holes are of 0.1 - 0.2 micron size. This fact provides the protection against breakthrough of bacteria.

UltraFilter is connected to the hose's section by instant fittings of John Guest® type. Straight and elbow fittings come standard with the White Energy supply package for easy connection in any position. The UltraFilter's housing is fixed by a plastic clip, which is mounted to a wall or horizontal surface by self-tapping screws or adhesive tape.



wired sensor

## Description:

Brane TDS is an electronic sensor of remaining salt content.

It measures electric conduction of water, which depends directly on the remaining salt content. Therefore, both reverse osmosis cartridges should be replaced only after the capacity's attenuation, not after the lapse of scheduled time.

The Brane TDS is connected to the tubes by fittings of John Guest® type at inspection points. The sensor is connected / disconnected manually with a slight effort without using tools.

Electric power is supplied by two AA batteries. The replacement interval is once every two years.

## Supply kit:

1. Replacement high-precise ultrafilter

## Advantages:

Instant water tubes connection of John Guest® type

Instant mounting by clips

Pore's sizes: 0.01 - 0.03 micron

High level of bacteria's trapping

*Attention! If 2 or more Brane Filter units are connected in parallel the Brane UV Filter sterilizer must be installed instead of UltraFilters.*

# Brane TDS

Optional electronic water purity sensor

Dimensions: 116 mm x 32 mm x 68 mm (LxWxH)

Weight: 300 g

Connections: 1/4" John Guest® female

Power supply: 2 x AA

Sensors: 2 pcs

Length of wires: 1 m

Measurement range: 0 - 9990 ppm

## Supply kit:

1. Electronic sensor of water purity (TDS)
2. AA Batteries - 2 pcs

## Advantages:

Instant connection of water tubes by John Guest® fittings

High precision of measurement

2 inspection points

Life-time of batteries is approx. 2 years

Does not require connection to an external power supply

# White Energy 6

Central unit 6 l/h with QUICK / CEL-DKOL connection



Dimensions with cover:	480 mm x 260 mm x 220 mm (LxWxH)
Dimensions w/o cover:	410 mm x 175 mm x 180 mm (LxWxH)
Weight with cover (w/o water):	13000 g
Weight w/o cover (w/o water):	10700 g
Input pressure:	2.5 - 6 bar
Output pressure:	30 - 70 bar (controlled manually or automatically)
Nominal capacity:	6 l/h
Power adapter:	100 - 240VAC, 50/60Hz
Energy input:	170 W
Cover's material:	plastic
Material of inner constructions:	high quality aluminium, stainless steel
Low pressure connections:	2 x 1/4" John Guest® female (quick connect fittings)
White Ray SS Hoses' connections:	2 x QUICK female or 2 x CEL 12x1.5 (with QUICK-M-CEL adapter)

Electronic connectors:	X1 - Power
	X2 - Stop / Forced washing
	X3 - Request for humidification
	X4 - High pressure adjustment
	X5 - Error output / Ready output
	X6 - Interface

## Description:

White Energy 6 – a central unit of the Universe humidification system, it's nominal capacity is 6 liters of atomized water per hour. The unit also has controlled pump with damping hoses, set of control valves, controlling electronics and sensors.

Purified water enters the central unit after Brane filter or from another one. The White Energy maintains constant pressure in the pipeline, directing water to fogging nozzles. Operating pressure can be set within 30 to 70 bar at the electronic module located on the central unit or an external regulator. The central unit receives requests for start/stop from wireless controllers or external automation. Electronics is protected against inner water leakages and hose's burst. Electric power supplies by a 230VAC adapter.

A synchronous DC motor maintains low-noise and smooth pump's operation.

An external ultrafilter included in a supply package guarantees sterility of income water.

The White Energy unit has an input for water, an output for a connection to drainage, also connections for pipeline going to nozzles. Connections for water supply and drainage are instantly connectable/disconnectable. Inner elements contacting water are made of high quality stainless steel or special plastic, that is why the central unit may operate using deeply purified water, without risk of corrosion.

The central unit's cover is fixed by magnets and can be easily removed by hands. The White Energy unit is supposed to be installed at any horizontal surface.

## Difference between White Energy 6 and 18:

The difference between two units, White Energy 6 and White Energy 18 is in nominal capacity which is 6 and 18 liters per hour respectively. These water flows are provided by two different pumps, which are installed in units.

## Advantages:

Very low noise operation, installation is acceptable near living spaces

Very low power consumption

All elements contacting water are made of high quality stainless steel

Leakage control inside the unit and control of the pipeline's burst

Instant connection of input and output tubes without using any tools

Wide range of supported pressure - from 30 to 70 bar

Automatic support of pressure

Operation with both wired and wireless humidity sensors

Possibility to be connected to automation or timer

# White Energy 18

Central unit 18 l/h with QUICK / CEL-DKOL connection



Dimensions with cover:	480 mm x 260 mm x 220 mm (LxWxH)
Dimensions w/o cover:	410 mm x 175 mm x 180 mm (LxWxH)
Weight with cover (w/o water):	13600 g
Weight w/o cover (w/o water):	11200 g
Input pressure:	2.5 - 6 bar
Output pressure:	30 - 70 bar (controlled manually or automatically)
Nominal capacity:	18 l/h
Power adapter:	100 - 240VAC, 50/60Hz
Energy input:	200 W
Cover's material:	plastic
Material of inner constructions:	high quality aluminium, stainless steel
Low pressure connections:	2 x 1/4" John Guest® female (quick connect fittings)
White Ray SS Hoses' connections:	2 x QUICK female or 2 x CEL 12x1.5 (with QUICK-M-CEL adapter)

Electronic connectors:	X1 - Power
	X2 - Stop / Forced washing
	X3 - Request for humidification
	X4 - High pressure adjustment
	X5 - Error output / Ready output
	X6 - Interface

## Description:

White Energy 18 – a central unit of the Universe humidification system, it's nominal capacity is 18 liters of atomized water per hour. The unit also has controlled pump with damping hoses, set of control valves, controlling electronics and sensors.

Purified water enters the central unit after Brane filter or from another one. The White Energy maintains constant pressure in the pipeline, directing water to fogging nozzles. Operating pressure can be set within 30 to 70 bar at the electronic module located on the central unit or an external regulator. The central unit receives requests for start/stop from wireless controllers or external automation. Electronics is protected against inner water leakages and hose's burst. Electric power supplies by a 230VAC adapter.

A synchronous DC motor maintains low-noise and smooth pump's operation.

An external ultrafilter included in a supply package guarantees sterility of income water.

The White Energy unit has an input for water, an output for a connection to drainage, also connections for pipeline going to nozzles. Connections for water supply and drainage are instantly connectable/disconnectable. Inner elements contacting water are made of high quality stainless steel or special plastic, that is why the central unit may operate using deeply purified water, without risk of corrosion.

The central unit's cover is fixed by magnets and can be easily removed by hands. The White Energy unit is supposed to be installed at any horizontal surface.

## Difference between White Energy 6 and 18:

The difference between two units, White Energy 6 and White Energy 18 is in nominal capacity which is 6 and 18 liters per hour respectively. These water flows are provided by two different pumps, which are installed in units.

## Advantages:

Very low noise operation, installation is acceptable near living spaces

Very low power consumption

All elements contacting water are made of high quality stainless steel

Leakage control inside the unit and control of the pipeline's burst

Instant connection of input and output tubes without using any instrument

Wide range of supported pressure - from 30 to 70 bar

Automatic support of pressure

Operation with both wired and wireless humidity sensors

Possibility to be connected to automation or timer

# Boson

## Main zone control unit

Dimensions: 72 mm x 18 mm x 82 mm (LxWxH)

Weight: 130 g

Frequency range: 433 MHz

Effective range: up to 1000 m

Charging port: micro-USB

Battery runtime: 6 - 7 months



side view  
with the connected external antenna  
(for maximum distance)



front view  
with the connected external antenna  
(for maximum distance)

## Description:

Boson – a room electronic air humidity controller. It allows one to set the required humidity and to switch humidification modes: automatic, off, testing. Boson displays the actual humidity level and room's temperature. It has a touch display, which blinks off during downtime and is activated by touch.

The Boson is a wireless controller, transmitting a control signal on a frequency of 433 MHz. The unique algorithms of control signal processing allow enlargement of the operating area by several times without increasing power consumption. Its radio signal easily penetrates concrete walls, which allows one to use it in modern buildings. In case if a signal receiver (the White Energy central unit) is remote, the miniature antenna should be installed, it is included in the supply package.

The Boson has an built-in rechargeable battery, which should be charged by the supplied adapter once per half of a year or even rarely (depending on conditions of use).

To avoid significant decrease of the operating signal range, do not install the Boson on a metal surface or on walls in close proximity to massive metal elements.

The Boson can be mounted on any surfaces by the use of the supplied fastener.

## Supply kit:

1. Main zone control unit
2. Power adapter for charging the internal battery
3. Antenna
4. Mounting kit
5. Manual

## Advantages:

- High signal range, in concrete buildings also
- High measurement accuracy
- Battery service life is up to half of a year
- Touch-screen display
- Fast mounting to walls



side view  
with the connected external antenna  
(for maximum distance)



front view  
with the connected external antenna  
(for maximum distance)

# Shadow

Additional zone control unit

Dimensions: 72 mm x 18 mm x 82 mm (LxWxH)

Weight: 130 g

Frequency range: 433 MHz

Effective range: up to 1000 m

Charging port: mini-USB

Battery runtime: 6 - 7 months

## Description:

Shadow – an electronic humidity restrictor (maximum humidistat). It allows one to limit the maximum humidity level in minor rooms, i.e. where the main controller is not installed. It is necessary to avoid excessive humidification. The Shadow unit helps to set a maximum air-humidity limit. It has a touch display, which blinks off during downtime and activates by touch.

Shadow is a wireless controller, transmitting a control signal on a frequency of 433 MHz. The unique control signal processing algorithms allow enlargement of the operating area by several times without increasing power consumption. Its radio signal easily penetrates concrete walls, which allows one to use it in modern buildings. In case if a signal receiver (White Energy central unit) is remote, the miniature antenna that is included in the supply package should be installed.

The Shadow unit has an rechargeable battery, which should be charged by the supplied adapter once per half of a year or even rarely (depending on conditions of use).

To avoid significant decrease of operating signal range do not install Shadow on a metal surface or on a wall with massive metal elements located nearby.

Shadow is mounted on any surface by means of a supplied fastener.

## Supply kit:

1. Additional (limitation) zone control unit
2. Power adapter for internal battery charging
3. Antenna
4. Mounting kit
5. Manual

## Advantages:

- High signal range, including in concrete buildings
- High measurement accuracy
- Battery service life is up to half of a year
- Touch-screen display
- Fast mounting to walls

# Gravity +

## Passive splitter with QUICK connection

Dimensions: 86 mm x 45 mm x 44 mm (LxWxH)

Weight: 350 g

Max. pressure: 10 MPa

Material: AISI316L stainless steel

Connections: 2 x QUICK female  
(rear side),  
2 x UNC10/24 female  
(front side),  
1 x UNC10/24 female  
(lateral face)



rear view



top side view,  
with QUICK connections,  
two NOVA nozzles  
and DOT plug

### Description:

Gravity + is a splitter of high pressure, made of high quality AISI316L stainless steel.

It has 3 threaded UNC connections for screwing of fogging nozzles or plugs. You may screw nozzles manually, without using any tools. Two nozzle connections are located at the front side, one at the lateral side. Unused connections should be screwed by plugs, thereby the splitter may be installed with 1, 2 or 3 nozzles, which is corresponding to the following fogging capacity: 1.2, 2.4 or 3.6 l/h under maximum pressure. Instead of nozzles, one may install intermediate Tunnel extenders and turning Lens joint.

At the rear side of Gravity + instant QUICK connections (2 pcs) are located, they provide durable connection for feeding and outfeeding White Ray SS Hoses. Feed and outfeed hoses may be connected to any connector. Connection and disconnection is made by hands with a slight pressure without using special tools.

Gravity + splitter can be easily mounted by two magnets located at the rear side. These magnets hold Gravity + with the installed nozzles on a special mounting plate made of magnetic stainless steel, included in a standard supply package. A mounting bracket which is designed for open type of installation to the wall or ceiling, is made of magnetic stainless steel and is also included in the supply package.

*Attention! Disconnection of QUICK connector should be done without water pressure.*

### Advantages:

Instant QUICK connection

Fast mount by neodymium magnets

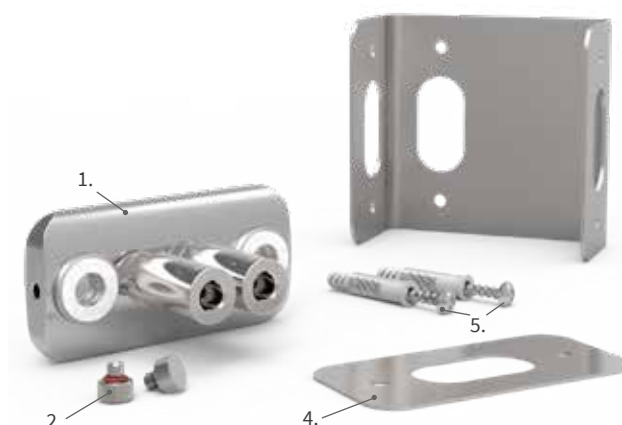
Passable construction without stagnant zones

High-quality stainless steel

Seals made of corrosion resistant Viton® fluoroelastomer

### Supply kit:

1. Splitter's body with the installed QUICK connectors and magnets
2. Dot - plug for UNC connection of nozzles - 2 pieces
3. Magnetic bracket
4. Mounting magnetic plate
5. Mounting kit





## Types of mounting for Gravity + splitter

### 1. Hidden mounting of feeding hoses

In case of hidden mounting of feeding hoses magnet plate from supply package of Gravity + is used. It should be mounted to the wall by self-tapping screw and standard wall plug. Hoses are placed in the wall through a hole. The splitter installed vertically or horizontally reposes on the plate by magnets located at the rear side.



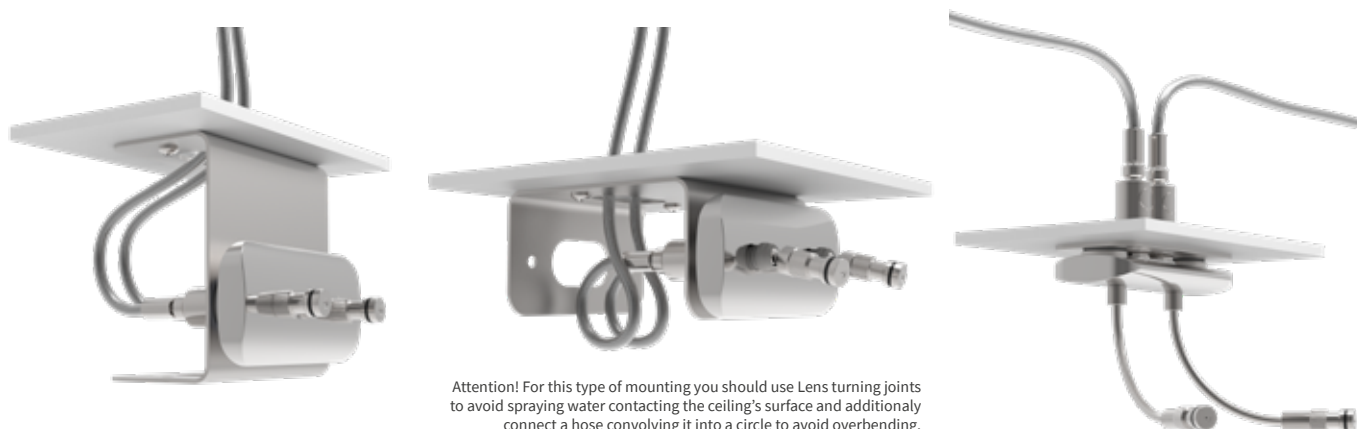
### 2. Open mounting of feeding hoses

For this type of mounting of feeding hoses a magnet bracket from Gravity's supply package should be used.



### 3. Mounting to the ceiling

When it is necessary to install the splitter on the ceiling, one may use the magnet bracket, fixing it in one of the two possible ways. In the first case, a narrow side of the bracket may be fixed to a ceiling providing sufficient distance from nozzles to the ceiling's surface. In the second case, the extended side may be fixed, this method provides for mounting it closer to the ceiling. In case of hidden installation of feeding hoses firstly you should use the magnet plate and then use Tunnel 10 extender for correct positioning of the nozzle from the ceiling.





# Binary Sat +

Straight tee with QUICK connection and UNC side connection



front view  
with Nova nozzle connected

Dimensions: 17 mm x 98 mm (ØxL)

Weight: 120 g

Max. pressure: 10 MPa

Material: AISI316L stainless steel

Connections: 2 x QUICK female,  
1 x UNC10/24 female

## Description:

Binary Sat + is a high pressure tee made of AISI316L stainless steel.

At the lateral side of the tee there is an UNC connection, in which the fogging nozzle or Tunnel extender may be installed. Therefore, the one nozzle may be installed into the tee, which is corresponding to the following fogging capacity: 1.2 l/h under maximum pressure at the hoseline.

At the ends of Binary Sat + instant QUICK connections (2 pcs) are located, they provide durable connection for feeding and outfeeding White Ray SS Hoses. Feed and outfeed hoses may be connected to any connector. Connection and disconnection is made by hands with a slight press without using special tools.

Binary Sat + may be opened or hidden installed behind the wall or the ceiling, in the latter case Tunnel extender is required for placing the nozzle into the room. In case of hidden installation it is recommended to pay attention to the tightness of the Tunnel extender's screwing into UNC connection at the surface of Binary Sat +. That's why, this tee is recommended for professional installation. Mounting clip is included into the supply package.

*Attention! Disconnection of QUICK connector should be done without water pressure.*

## Supply kit:

1. Tee's body with the installed QUICK connections
2. Mounting kit



## Advantages:

Instant QUICK connections

High quality stainless steel

Seals made of corrosion resistant Viton® fluoroelastomer

Possibility of both, opened and hidden installation

Low-cost alternative to Gravity +

## Types of Binary Sat + tee's mounting

### 1. The open mounting to the wall

In case of open mounting of Binary Sat + to the wall, the magnet plate from supply package is used. It should be mounted to the wall by self-tapping screw and standard wall plug, after that the tee can be easily magnetised to the plate.



### 2. The hidden installation in the structural passes

Binary Sat + may be mounted into the structural passes, in this case Nova nozzle may be directed to the room by Tunnel 10 or Tunnel 50 extenders.



## Types of nozzle's connection to Binary Sat+

For the Binary Sat + connection to UNC one may used the following items:

**Dot**  
Plug for nozzle's connection



**Lens**  
Turning nozzle's joint



**Nova**  
Nozzle with ruby insert



**Tunnel 10**  
Flexible nozzle extender, 10 cm



**Tunnel 50**  
Flexible nozzle extender, 50 cm



The easiest way of using of Binary Sat + is the Nova nozzle connected to the UNC side connection.



Nova is used together with Lens swivel joint in case when the direct atomizing is required.



Tunnel 10 (or Tunnel 50) are used for the hidden mounting, in this case Nova nozzle will be withdrawn from the hoses and Binary Sat + tee.



# Binary +

## Straight QUICK connector

Dimensions: 94 mm x 18 mm x 16 mm (LxWxH)

Weight: 105 g

Max. pressure: 20 MPa

Material: AISI316L stainless steel

Connections: 2 x QUICK female



### Description:

Binary + is a straight fitting made of high quality AISI316L stainless steel for high-pressure hoses' extension for the purpose of the length increase.

Instant QUICK connectors (2 pcs) on both sides provide durable connection of feed and outfeed White Ray SS Hoses. Inlet and outlet hoses can be connected to any connector.

Connection and disconnection is made by hands with a slight press without using tools. Straight Binary + connector can be mounted by the Mounting kit comes standard with the supply package or it can be left loose.

### Advantages:

Instant QUICK connections

High quality stainless steel

Seals made of corrosion resistant Viton® fluoroelastomer

### Supply kit:

1. Connector's body with the installed QUICK connections
2. Mounting kit



### Mounting:

Binary + connector can be mounted by the mounting kit comes standard with the supply package or it can be left loose.



*Attention! Disconnection of QUICK connector should be done without water pressure.*

# Singular +

End connector with QUICK connection



Dimensions: 52 mm x 18 mm x 16 mm (LxWxH)

Weight: 60 g

Max. pressure: 20 MPa

Material: AISI316L stainless steel

Connections: QUICK female

## Description:

Singular + is a single end connector for high pressure hose's closure, usually temporary, made of high quality AISI316L stainless steel.

Instant QUICK connection provides durable connection with White Ray SS Hoses' fitting. Connection / disconnection can be made manually without using special tools.

Singular + end connector can be mounted by the Mounting clip comes standard with the supply package or it can be left loose.

## Advantages:

Instant QUICK connection

High quality stainless steel

Seals made of corrosion resistant Viton® fluoroelastomer

## Supply kit:

1. End connector's body with QUICK connection
2. Mounting kit



# Pin +

Plug for QUICK connection



Dimensions: 26.5 mm x 10 mm (ØxL)

Weight: 8 g

Max. pressure: 20 MPa

Material: AISI316L stainless steel

Connections: QUICK male

## Description:

Pin + is similar to QUICK Fit fitting, but it is without a hole. Pin + is inserted into QUICK connector like a stopper for a purpose of temporary or permanent blocking.

Connection / disconnection of Pin + is made manually with a slight effort without using special tools.

## Advantages:

Instant QUICK connection

High quality stainless steel

*Attention! Disconnection of QUICK connector should be done without water pressure.*

## Supply kit:

1. Plug's body for QUICK connection

# Gravity

## Passive splitter with DKOL connection



rear view



top side view,  
with DKOL connections,  
two NOVA nozzles  
and DOT plug

Dimensions: 86 mm x 29 mm x 44 mm (LxWxH)

Weight: 300 g

Max. pressure: 10 MPa

Material: AISI316L stainless steel

Connections: 2 x CEL 12x1.5  
(rear side),  
2 x UNC10/24 female  
(front side),  
1 x UNC10/24 female  
(lateral face)

## Description:

Gravity is a high pressure splitter, made of high quality AISI316L stainless steel.

The only difference from Gravity+ is the use of CEL-DKOL connections, which provide durable connection of feed and outfeed White Ray SS Hoses. Feed and outfeed hoses can be connected to any connector. Connection / disconnection can be made by a standard wrench.

Gravity has 3 threaded UNC connections for screwing of fogging nozzles or plugs. You may screw nozzles manually, without using any tools. Two nozzle connections are located at the front side, one at the lateral side. Unused connections should be screwed by plugs, thereby the splitter may be installed with 1, 2 or 3 nozzles, which is corresponding to the following fogging capacity: 1.2, 2.4 or 3.6 l/h under maximum pressure. Instead of nozzles, one may install intermediate Tunnel extenders and turning Lens joint.

Gravity splitter can be easily mounted by two magnets located at the rear side. These magnets hold Gravity with the installed nozzles on a special mounting plate made of magnetic stainless steel, included in a standard supply package. A mounting bracket which is designed for open type of installation to the wall or ceiling, is made of magnetic stainless steel and is also included in the supply package.

## Advantages:

Fast CEL-DKOL connection

Fast mount by neodymium magnets

Passable construction without stagnant zones

High-quality stainless steel

Seals made of corrosion resistant Viton® fluoroelastomer

## Supply kit:

1. Splitter's body with the installed DKOL connectors and magnets
2. Dot -plug for UNC connection of nozzles - 2 pieces
3. Magnetic bracket
4. Mounting magnetic plate
5. Mounting kit



*Attention! Disconnection of DKOL connector should be done without water pressure.*

## Types of Gravity splitter's mounting:

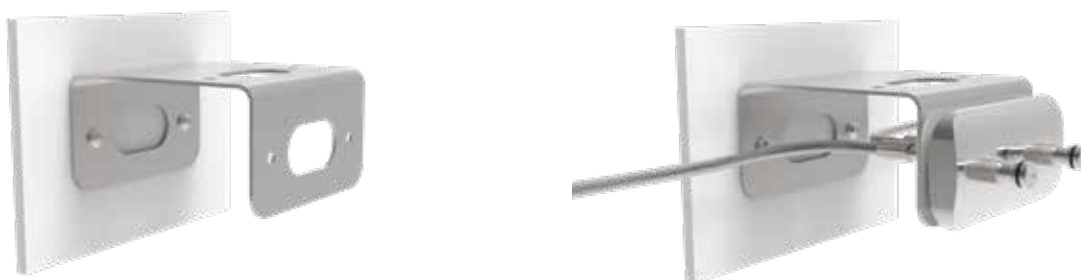
### 1. Hidden mounting of feeding hoses

In case of hidden mounting of feeding hoses magnet plate from supply package of Gravity is used. It should be mounted to the wall by self-tapping screw and standard wall plug. Hoses are placed in the wall through a hole. The splitter installed vertically or horizontally reposes on the plate by magnets located at the back side.



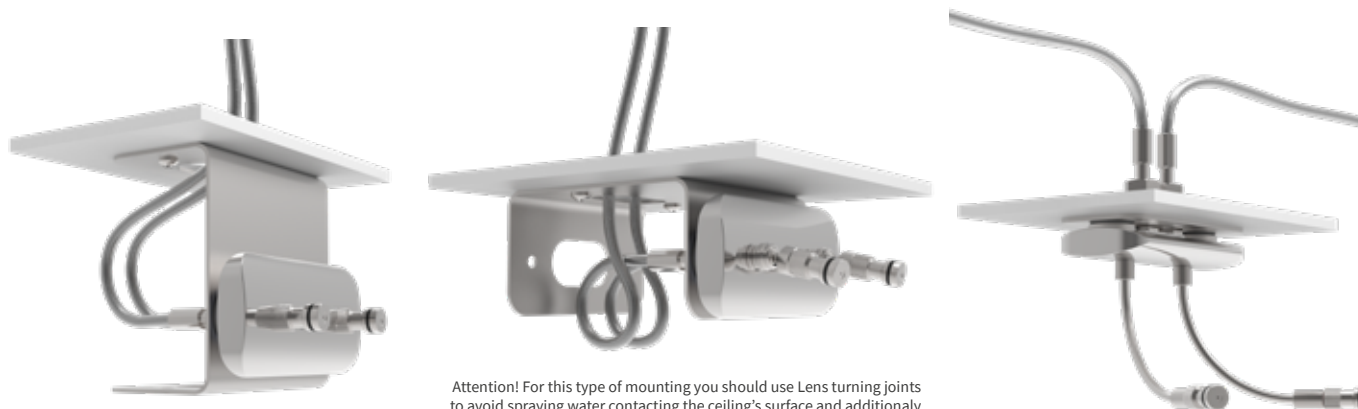
### 2. Open mounting of feeding hoses

For this type of mounting of feeding hoses a magnet bracket from Gravity's supply package should be used.



### 3. Mounting to a ceiling

In cases when it is necessary to install the splitter to a ceiling one may use the magnet bracket, fixing it by one of two possible ways. In the first case, a narrow side of the bracket may be fixed to a ceiling, providing sufficient distance from nozzles to a ceiling's surface. In the second case - extended side may be fixed, this way provides to mount it to closer to a ceiling. In case of hidden installation of feeding hoses firstly you should mount the magnet plate and then install intermediate Tunnel 10 extender for correct positioning of the nozzles outwards the ceiling surface.



# Binary Sat

Straight tee with DKOL connection and UNC side connection



front view  
with Nova nozzle connected

Dimensions: 17 mm x 64 mm (ØxL)

Weight: 60 g

Max. pressure: 10 MPa

Material: AISI316L stainless steel

Connections: 2 x CEL-DKOL,  
1 x UNC10/24 female

## Description:

Binary Sat is a high pressure tee made of AISI316L stainless steel.

There is an UNC thread connection at the face surface of the tee, into which the atomizing nozzle or Tunnel extender should be screwed. Therefore, one nozzle may be installed into the splitter, which corresponds to 1.2 l/h capacity under maximum pressure in the hoseline.

At the ends of the Binary Sat fast CEL-DKOL connections (2 pcs) are located, providing a durable connection for infeeding and outfeeding White Ray SS Hoses. Feed and outfeed hoses may be connected to any connector. Connection and disconnection is made by a simple wrench.

Binary Sat may be installed open or hidden behind the wall or the ceiling. In the latter case Tunnel extender is required for placing the nozzle into the room. In case of hidden installation it is recommended to pay attention to how tightly the extender is screwed into the UNC connection at the surface of Binary Sat. For this reason, this tee is recommended for professional installation. A mounting clip is included into the supply package.

*Attention! Disconnection of DKOL connector should be done without water pressure.*

## Supply kit:

1. Tee's body with the installed DKOL connections
2. Mounting kit



## Advantages:

- Fast CEL-DKOL connections
- High quality stainless steel
- Seals made of corrosion resistant Viton® fluoroelastomer
- Possibility of either open or hidden installation
- Low-cost alternative to Gravity

## Types of Binary Sat tee's mounting

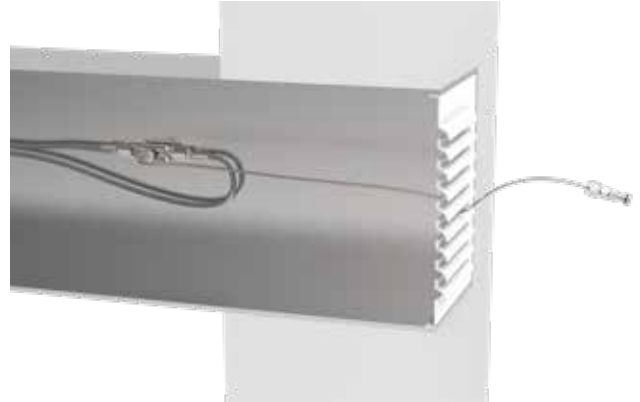
### 1. Open mounting to the wall

When mounting of the Binary Sat to a wall, the magnet plate from the supply package is used. It should be mounted to the wall by self-tapping screws and a standard wall plug; after that the tee can be easily magnetised to the plate.



### 2. Hidden installation in structural passes

Binary Sat may be mounted into the structural passes, in this case Nova nozzle may be directed into the room by Tunnel 10 or Tunnel 50 extenders.



## Types of nozzle's connection to the Binary Sat

For the Binary Sat + connection to UNC the following items may be used:

**Dot**  
Plug for nozzle's connection



**Lens**  
Swivel nozzle's joint



**Nova**  
Nozzle with ruby insert



**Tunnel 10**  
Flexible nozzle's extender, 10 cm



**Tunnel 50**  
Flexible nozzle's extender,  
50 cm



The easiest way to use Binary Sat is Nova nozzle connected to the UNC side connection.



Nova is used together with Lens swivel joint in case when the direct atomizing is required.



Tunnel 10 (or Tunnel 50) is used for a hidden mounting, in this case Nova nozzle will be withdrawn from the hoses and Binary Sat tee.





# Binary

## Straight DKOL connector

Dimensions: 52 mm x 18 mm x 16 mm (LxWxH)

Weight: 55 g

Max. pressure: 20 MPa

Material: AISI316L stainless steel

Connections: 2 x CEL 12x1.5



### Description:

Binary is a straight fitting made of high quality AISI316L stainless steel for high-pressure pipes' extension for the purpose of increasing the overall length.

Fast CEL-DKOL connectors (2 pcs) on both sides provide durable connection of feed and outfeed White Ray SS Hoses. Inlet and outlet hoses can be connected to any connector.

Connection / disconnection can be made by a standard wrench without using special tools.

### Advantages:

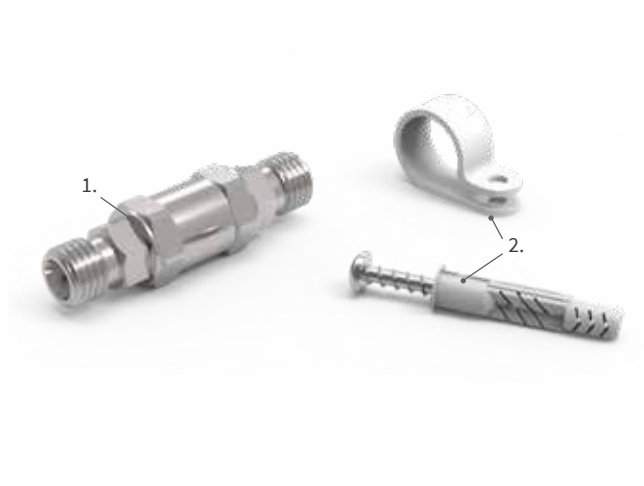
Fast CEL-DKOL connections

High quality stainless steel

Seals made of corrosion resistant Viton® fluoroelastomer

### Supply kit:

1. Connector's body with the installed DKOL connections
2. Mounting kit



### Mounting:

Binary connector can be mounted using the mounting kit, which comes standard with the supply package or it can be left loose.



*Attention! Disconnection of DKOL connector should be done without water pressure.*

# Singular

End connector with DKOL connection



Dimensions: 35 mm x 18 mm x 16 mm (LxWxH)

Weight: 35 g

Max. pressure: 20 MPa

Material: AISI316L stainless steel

Connections: 1 x CEL 12x1.5

## Description:

Singular is a single end connector for high pressure hose's closure, usually temporary, made of high quality AISI316L stainless steel.

Fast CEL-DKOL connector provides durable connection with White Ray SS Hoses' fitting. Connection / disconnection can be made by a standard wrench without using special tools.

Singular can be mounted by the mounting clip, which comes standard with the supply package or it can be left loose.

## Advantages:

Fast CEL-DKOL connection

High quality stainless steel

Seals made of corrosion resistant Viton® fluoroelastomer

## Supply kit:

1. End connector's body with CEL connection
2. Mounting kit



# Pin

Plug for DKOL connector



Dimensions: 21 mm x 14 mm x 16 mm (LxWxH)

Weight: 15 g

Max. pressure: 20 MPa

Material: AISI316L stainless steel

Connections: 1 x DKOL

## Description:

Pin is similar to DKOL Fit fitting, but it is without a hole. Pin is inserted into DKOL connector for the purpose of a temporary or permanent block.

Connection / disconnection of the Pin is made by a standard wrench without using special tools.

## Advantages:

Fast CEL-DKOL connection

High quality stainless steel

*Attention! Disconnection of DKOL connector should be done without water pressure.*

## Supply kit:

1. Plug for DKOL connection

# Nova

## Nozzle with ruby insert



Dimensions:	10 mm x 24 mm (ØxL)
Weight:	8 g
Max. pressure:	8 MPa
Capacity under 7 MPa pressure:	1.2 l/h
Replacement filter, stainless steel:	pores 40 micron
Diameter of spraying hole in a ruby:	85 micron
Drop's size:	10 – 30 micron
Anti-dripping valve:	Viton® seal
Material:	AISI316L and AISI302 stainless steel, Viton®, ruby
Connections:	UNC10/24 male

## Description:

Nova nozzle performs the main function of humidification system - formation of discharge pattern consists of microdroplets. It may be screwed into Gravity (+) splitter or Binary Sat (+) tee by hand. Fogging is made by pressure of incoming water. Spraying conditions are selected according to the size of droplets, within 10 - 30 micron. This fact provides that microdroplets quickly dissolve in the air.

A nozzle's body and all metal elements of the systems operating with deeply purified water are strictly made of stainless steel because demineralized water is corrosive to many types of metals.

This is important to know that under 2.5 - 7.5 MPa water pressure, nozzle's capacity increases proportionally to the water pressure. Size of microdroplets increases under the decrease of water pressure.

## Advantages:

- Manual screwing and unscrewing because of UNC connection
- Low noise operation
- Optimum size of microdroplets for fast diffusion
- Anti-dripping valve
- Long life because of ruby insert
- High quality stainless steel
- Seals made of corrosion resistant Viton® fluoroelastomer

## Nozzle's components:

- atomizing ruby insert
- swirl chamber
- anti-dripping valve with Viton® seal
- filter
- body made of AISI316L stainless steel

Application of a ruby insert provides more thin and homogeneous atomizing because of accurate geometry of the spraying hole. Ruby insert provides steady operation for 5 or more years. Atomizing hole is of 85 micron size, it's diameter is selected according to the exact size of droplets and the exact capacity.

The swirl chamber is located before the atomizing hole and forms swirling water movement. This is necessary for the comminution of water into microdroplets of fixed dimension, it is also necessary for forming an accurate fogging jet.

The anti-dripping valve is one of the most important elements of Nova nozzle. By using this element we exclude the appearance of water drops at the nozzle's end while the system switching. The main purpose of this valve is to shut off water in case of insufficient pressure and if it impossible to maintain effective fogging.

The filter is necessary to exclude dust contaminants, which may remain at the hose line after the installation process. These particles may plug the nozzle ruby's hole. The filter made of sintered stainless steel powder and it's filtration capacity is 40 micron, which provides an effective protection of the atomizing hole.

## Lens

### Swivel nozzle's joint



rear view

#### Description:

Swivel nozzle's joint Lens consists of two parts, connected by leak-proof joint, this option allows changing the direction of nozzles aside within 25 degrees. It is very important in case if there is installed more than one nozzle and it is necessary to set atomizing in different sides for even spread. Lens is screwed into UNC connection at the splitter, and only then, Nova nozzle is screwed into Lens.

Change of the joint's angle is made manually, when Lens has been screwed in Gravity (+) splitter or Binary Sat (+) tee and Nova nozzle has been already installed.

*Attention! Changing of the positioning angle should be made strictly without water pressure.*

Dimensions: 10 mm x 22 mm (ØxL)

Weight: 7.5 g

Max. pressure: 8 MPa

Material: AISI316L stainless steel

Connections: 1 x UNC10/24 male,  
1 x UNC10/24 female

#### Advantages:

Manual screwing and unscrewing because of UNC connection

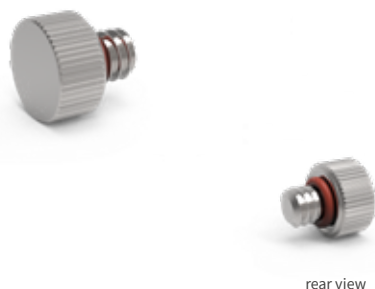
Manual joint's angle change

High quality stainless steel

UNC seals made of corrosion resistant Viton® fluoroelastomer

## Dot

### Plug for UNC nozzle connection



rear view

#### Description:

Dot plug is designed to block the unused UNC connections at Gravity (+) and Binary Sat (+).

Dimensions: 9.5 mm x 9.5 mm (ØxL)

Weight: 3 g

Max. pressure: 10 MPa

Material: AISI316L stainless steel

Connections: 1 x UNC10/24 male

#### Advantages:

Manual screwing and unscrewing because of UNC connection

High quality stainless steel

UNC seals made of corrosion resistant Viton® fluoroelastomer

# Tunnel 10

Flexible nozzle extender, 10 cm



Dimensions: 8 mm x 100 mm (ØxL)

Weight: 14 g

Max. pressure: 8 MPa

Material: AISI 316L stainless steel

Connections: 1 x UNC10/24 male,  
1 x UNC10/24 female

## Description:

Flexible nozzle extender Tunnel 10 is screwed into UNC connections of Gravity (+) or Binary Sat (+). Nova nozzle is screwed into Tunnel.

The extender can be bent manually, formed into any shape and holding it. It is especially useful in the case of hidden installation of Gravity (+) splitter or Binary Sat (+) or if it is necessary to position fogging to different sides.

## Advantages:

Manual screwing and unscrewing because of UNC connection

Bending into any shape

UNC seals made of corrosion resistant Viton® fluoroelastomer

# Tunnel 50

Flexible nozzle extender, 50 cm



Dimensions: 12 mm x 500 mm (ØxL)

Weight: 46 g

Max. pressure: 10 MPa

Material: AISI316L stainless steel

Connections: 1 x UNC10/24 male

## Description:

Flexible nozzle extender Tunnel 50 is screwed into UNC connections of Gravity (+) or Binary Sat (+). Nova nozzle is screwed into Tunnel.

The extender can be bent manually, formed into any shape and holding it. It is especially useful in the case of hidden installation of Gravity (+) splitter or Binary Sat (+) or if it is necessary to position fogging to different sides.

## Advantages:

Manual screwing and unscrewing because of UNC connection

Bending into any shape

UNC seals made of corrosion resistant Viton® fluoroelastomer

## Types of nozzle's connection to the Gravity (+) splitter

Body of Gravity (+) using three types of UNC connection allows to create different types of fogging: two at the front side and one at the lateral side. The following components are used for this purpose:

**Dot**  
Plug for nozzle's connection



**Lens**  
Turning nozzle's joint



**Nova**  
Nozzle with ruby insert



**Tunnel 10**  
Flexible nozzle extender, 10 cm



**Tunnel 50**  
Flexible nozzle extender, 50 cm



One Nova nozzle at the front side and Dot plugs at the lateral and front sides is a minimum operation variant.



Two Nova nozzles at the front side and Dot plug at the lateral side - an optimum variant for simple mounting on the wall.



Two Nova nozzles with swivel Lens joints and Dot plug at the lateral side is a variant for directed fogging.



Nova nozzle on the flexible Tunnel 10 extender and two Dot plugs at the front side is for side mounting.



Nova nozzle on the flexible Tunnel 50 extender and two Dot plugs at the front side for complete hidden installation.



# White Ray SS Hose

Self-cleaning hose, Teflon®-Stainless Steel  
AISI304

Hose's diameter: 4.5 mm

Max. pressure: 30 MPa

Min. bending radius: 25 mm

Hose's material: PTFE (Teflon®) -  
AISI304 stainless steel

## Description:

PTFE (Teflon®) is a polymeric material, that is used in self-cleaning the White Ray SS Hose. PTFE is one of the most slippery materials in the world, offering the lowest adhesion (nothing can stick to this material).

In contrast to other materials, biofilms do not accumulate on the inner PTFE surface at all. PTFE cannot be digested by microorganisms because of its complete chemical resistance, and biofilms do not stick to the surface because of very low adhesiveness.

Armor and covering layer is made of AISI304 stainless steel. The extreme strength of this layer creates a nominal pressure margin of 4 times and a burst pressure of 15 times. At the same time, it is quite flexible and elastic. It also shows high resistance to breakings and to mechanical damages.

There is no marking made on the surface of the steel braiding for a possibility of open installation.

## Supply kit:

1. Hose, Teflon®-Stainless steel AISI304, length is ordered on an individual basis, max. 100 m, 0.5 m step

*Attention! Fittings should be purchased separately.*

## Advantages:

Self-cleaning inner surface

Microorganisms and biofilms are not accumulated

High level of durability and breaking's resistance

Nominal pressure margin is 4 times higher, burst pressure - 15 times

Flexibility and elasticity

Very thin

## QUICK fittings for White Ray SS Hose:

Article

### QUICK Fit

QUICK fitting for hose  
Dimensions: 10 mm x 42mm (ØxL)  
Material: AISI316L stainless steel

Article

### White Ray SS Fer

Ferrule for Teflon®-Stainless Steel hose  
Dimensions: 8 mm x 15 mm (ØxL)  
Material: AISI316L stainless steel



## DKOL fittings for White Ray SS Hose:

Article

### DKOL Fit

DKOL fitting for White Ray hose  
Dimensions: 10 mm x 33 mm (ØxL)  
Material: AISI316L stainless steel

Article

### White Ray SS Fer

Ferrule for Teflon®-Stainless Steel hose  
Dimensions: 8 mm x 15 mm (ØxL)  
Material: AISI316L stainless steel



# Questions & Answers

## 1. General questions

### 1.1 How much does the system cost?

You may ask the exact price of the system for your house or office to be calculated at your local representative.

### 1.2 What is the reason for the rather high price?

- First of all, all metal elements, contacting water are made of high quality stainless steel. This is necessary, because the highly purified water that is used for humidification may cause corrosion of carbon steel, copper, brass.
- Moreover, as you might have guessed, many modern technical solutions have determined the structure of our system, which required significant engineering inputs from the manufacturer.
- To increase the system's reliability and enhance performance, some elements are made of high-tech materials.

### 1.3 What are the advantages over other humidification systems?

- Maximum level of hygiene because of the multi-stage water purification and disinfection system, regular washings and system's construction avoiding contacting of water and air till the moment of atomization.
- May be installed in a finished interior
- Low power consumption
- Dust suppression
- Autonomous operation. The system gets water from the water supply and maintains a preset humidification level
- The central unit may be installed in any store room. Inlet hoses are thin, flexible and designed to be easily hidden into interior features. Only the nozzles are directed into the rooms
- Considerable distance are acceptable (up to 100 m) from the central unit to humidification zones
- Ability to humidify several rooms simultaneously
- High capacity range
- Only one or two maintenances per year
- Ability to use the system for air cooling during summer

### 1.4. What are the advantages among the analogues humidification systems of fogging type?

- System is rather cheaper than others of the same type
- Low noise operation because of modern pumps and complicated vibration/noise insulation
- Possibility to install without any professional help
- Water hoses are thin, flexible and supposed to be easily hidden into interior features. Only nozzles are directed into rooms

### 1.5. Is it possible to install the system into a finished interior?

Our system can be easily installed into any finished interior, in contrast to other types of humidifiers. The central unit and filters are designed to be installed in a storeroom, lavatory, or in the kitchen, wherever there is connection to a water supply, drainage and power supply. The hoses supplying water to the nozzles have a diameter of 4.5 mm and their minimum bending radius is 2.5 cm. This fact enables designing of the pipelines in different ways:

- open installation (possible because the hoses are aesthetically designed)
- in air ducts
- behind furniture and interior features (moldings, closets, etc)
- behind the ceiling
- hidden installation in structural passes

## 2. System's configuration

### 2.1. What is the minimum nozzle's capacity? What area can be serviced by one nozzle?

Pressure can be continuously regulated from quiet to forced modes. The capacity of one fogging nozzle is 1.2 l/h (forced) and 0.7 l/h (quiet mode).

The maximum serviced area depends on air exchange, temperature, and target humidity level. The minimum is not limited by design and should be just sufficient for normal operation of humidistat, which is a part of the zone controller. The target serviced area is about 10 - 60 m<sup>2</sup>.

### 2.2. Which types and sizes of rooms may be serviced by one system?

The maximum capacity of the White Energy 6 is 6 l/h, White Energy 18 – 18 l/h.

The maximum serviced area's size depends on air exchange, temperature and target humidity level. The minimum is not limited by design and should be just sufficient for normal operation of the humidistat, which is a part of the zone controller.

For the White Energy 6 the approximate area's volume range is from 30 m<sup>3</sup> to 900 m<sup>3</sup>, which corresponds to a square range from 10 m<sup>2</sup> to 300 m<sup>2</sup> assuming 3-meter-high ceilings; for the White Energy 18 this range is from 30 m<sup>3</sup> to 2700 m<sup>3</sup>, which corresponds to a square range from 10 m<sup>2</sup> to 900 m<sup>2</sup> assuming 3-meter-high ceilings

### 2.3. What is the maximum number of nozzles?

For the White Energy 6 the maximum number of nozzles is 5 pieces, and for the White Energy 18 it is 15 pieces.

### 2.4. Why is the hose line looped?

The hose line is looped to avoid stagnant zones, which may be comfort for growth of microorganisms. Water circulates in the system, providing an unequalled level of hygiene.



### 3. System's mounting

#### 3.1. Where may I locate the central unit?

It may be installed in any room with connection to water supply, drainage, and a power supply. For example, it may be a storeroom, kitchen, basement, boiler-room, laundry, lavatory, vent chamber, etc. One thing is important, the temperature should not be less than 0 °C.

We do not recommend installing the central unit in living spaces: bedrooms, living rooms, cabinets.

#### 3.2. What is the maximum length of the hose line?

The maximum length may vary depending on from different system's configurations.

The maximum length of the hose line (in meters) must be less than 1600 / (quantity of Nova nozzles), but maximum 200 m.

### 4. Mounting of nozzles

#### 4.1. Are decorative options for nozzles included into the supply package? Do nozzles strike one's eyes?

Nozzles are screwed into the splitters made of stainless steel. The dimensions of the splitter are: 86 mm x 45 mm x 44 mm. If necessary the nozzle may be hidden into interior features or in an air duct. In rooms only fogging nozzles may remain visible by using Tunnel 50.

#### 4.2. Where is it better to install nozzles?

- Nozzle installation should be planned taking into account the air flow distribution; in this case humidity will spread evenly around the premises. In other words, it is better to locate nozzles close to the supply ventilation and air-conditioning grills. Nozzles should not be installed very close to the exhaust grills.
- It is not necessary to install nozzles into every room, because humidity can easily spread around the premises. The nozzles may be installed in corridors or common rooms (if there is no blowing ventilation in rooms).
- Nozzles should not be installed over high furniture and doors (from the opening side).
- It is also desirable NOT to place nozzles over beds or sofas - cooling effect may be uncomfortable.

#### 4.3. What is the proper way to direct nozzles to prevent the accumulation of condensation?

Correctly placed nozzles help to prevent condensation, because the fogging droplets are of 10 - 30 micron size and succeed to vaporize, not precipitating onto the floor or to a furniture.

The minimum height from the floor to a nozzle is - 1.8 m, to opposite objects - 3 m. We do not recommend installing nozzles over high interior features and doors. The fogging nozzles should be placed horizontally or with a low downward grade (not more than 15°).

#### 4.4. Is it possible to install nozzles totally hidden?

It is impossible to hide the atomizing nozzles in a ceiling niche or in a wall, because of the appearance of condensation.

If a fresh air ventilation system is installed at your house you may locate the nozzles there. But it is important to know that it is possible to install nozzles at the air ducts only if special spray chamber and drop catcher have been installed in the fresh air vent. For proving this you should contact an installation company, which should take care of preventing the development of microorganisms in the spray chamber.

One of the main advantages of direct fogging humidification systems is a high level of hygiene; in other words, there are no system's elements in which microflora may develop. But if nozzles are installed in the air ducts, there is a chance of microflora's growth on wet duct's walls, and this fact neutralizes the main advantage of direct atomizing. That is why we do not recommend installing nozzles inside the air ducts.

The hoses and splitters may be placed in an air duct with only the fogging nozzles extending into a room through a ventilation grill (please see the mounting variants). This is the recommended type of installation.

### 5. Combination with other systems

#### 5.1. What types of ventilation Universe may be combined with?

Universe air humidification system is installed independently of ventilation; accordingly, it may be combined with any type of vent.

If there is a combined extraction and fresh air ventilation installed, it is important not to install nozzles close to the exhaust grilles. Locating nozzles near to the supply air grills or even installing them inside the grill is recommended.

#### 5.2. Is any additional heating required for operating the humidification system?

Under constant fogging of 1 l/h, 650W of cooling effect appears. Normally room's temperature decreases by 2 - 3 °C.

However, it turns out that the additional heating is not necessary or will be insignificant, because comfort temperature decreases when humidity is increased. In other words, we feel more comfortable when temperature is lower than in dry airspace. The reason is that water evaporates slowly from the skin surfaces and mucosae under normal humidity, so a person is chilled less due to natural evaporation.

### 6. Quality of inlet water

#### 6.1. Which parameters should the inlet water corresponds to?

Inlet water for the filter unit should corresponds to sanitary local regulations. In other words, general tap water is acceptable. Please check the Appendix 1 for detailed inlet water requirements.

Water pressure while the Brane Filter system is used: 2.5 - 4 bar.

Water pressure while feeding to the central unit White Energy: 2.5 - 6 bar.

#### 6.2. Is it possible to connect the system to well water? Is it necessary to install any additional equipment?

No, usually it is not recommended to connect the system to well water directly. Water should corresponds to local regulations of tap water. Water's quality depends on the region and well depth. A special filter set is required for an each region for the optimizing of water parameters.

#### 6.3. Is it necessary to use the Brane Filter system only or it is possible to choose another one?

You may choose any reverse osmosis filter set you want. You may install any reverse osmosis system, but strictly without subsequent water post-mineralization. Additional mineralization leads to the appearance of a white scurf on interior surfaces and also to aging of the system, because a scale may also appear on the inner elements of the system.

We recommend using the Brane Filter set because it was designed especially for humidification purposes. It contains two reverse osmosis membranes, which ensure to maintain the highest salt rejection level throughout the service life of the membranes. Moreover, there are two pumps installed, because significant water pressure range at the membranes may influence water purification efficiency. Outlet water is deeply demineralized, so it is not recommended for regular drinking.

### 7. Protection against leakages

#### 7.1. Are leakages possible?

This question can be divided into three sub-questions:

Is a leakage possible inside the central unit?

The central unit is equipped with a leakage sensor, which shuts the water supply off and stops the unit when a leakage is detected. At the bottom of the central unit there is a pan which can contain 300 ml of water. It is fully adequate for detecting a leakage and stopping the system.

Is leakage's appearance possible in the hoseline?

The hoseline directs water to fog nozzles and consists of DKOL/CEL or QUICK hoses and fittings, designed to work under pressure of hundreds of bar. The automation system of the central unit controls pressure drops in the hoseline and turns the unit off if a burst is detected.

Is a leakage possible in the water supply's pipeline connected to the central unit?

External supply like any plumbing connection may leak. An external leakage sensor can solve this problem. The sensor itself should be placed on the floor under the filter and the central units, and the valve should be installed into the pipeline that leads water to the system. When the sensor detects a leakage the valve turns the water off and reports about a failure by sound signal. You should turn the valve manually to resume water supply.

#### 7.2. How is protection against leakages at the hoses' connections achieved?

Two types of fittings are used in our system: QUICK and DKOL/CEL. These fittings are made of high-impact stainless steel and all the connection seals are made of corrosion resistant Viton® fluoroelastomer. Instant QUICK connections are made manually with a slight pressure, designed for 1000 connections and disconnections. In the case of DKOL/CEL, while connection of one fitting to another compaction is achieved by special construction with sealing insert. Connection is made by screwing a nut with a slight effort.

The fitting itself is mounted onto the hose by compressing a ferrule, made of stainless steel. The compression is produced by special hydraulic equipment under factory conditions. Analogous compressing technology is used for high pressure hoses in cars and construction machinery, but our fittings are made of stainless steel and protected against corrosion.

#### 7.3. Is there any possibility of dripping from nozzles?

An anti-dripping valve is included in the design of the nozzles, shutting the water supply off if the pressure is insufficient for effective atomizing. In such a way, it protects the nozzles against dripping during transition from atomizing mode to standby mode.

## 8. During system's operation

### 8.1. What power consumption is required?

Central unit White Energy 6: 170 W  
 Central unit White Energy 18: 200 W  
 Basic filter system Brane Filter: 60 W.

### 8.2. How noisily does the system operate?

The total noise level may be compared with the noise produced by modern desk computers. The level of quietness is achieved by several sound and vibroisolation layers, as well as careful selection of the equipment according to their noise characteristics. By locating the units in store rooms and bathrooms it is possible to install the system even in small apartments.

### 8.3. Do the nozzles hiss?

When nozzles operate there is a slight sound which can be more compared to whispering than to hissing. The sound is quiet soft and is not unpleasant under normal conditions. A quiet mode is also provided, reducing nozzle performance to approximately a half, and the sound becomes even quieter. This is especially important if the nozzles are installed in bedrooms.

### 8.4. Is it possible to stop the system for a night?

There is a control jack installed at the central unit, when its contacts are closed the system does not spray water even if it receives a request for humidification. This operation could be controlled by a general timer. In this way, it is possible to cancel humidification process overnight.

### 8.5. How long and often do the nozzles operate?

Operation of the nozzles depends on required / current humidity ratio. Thus, the nozzle operating time may fluctuate from 1 - 2 times (several minutes) per day to permanent operation.

### 8.6. Is it possible to switch the system off?

Even if there is no request for air humidification, there are automatic washings of inner elements and hoses. This is necessary for providing exclusive sanitary hygiene of all the elements and as a consequence, of the atomized water. For this reason, we do not recommend shutting the water and power supply off even if humidification is not required at all. Nevertheless, there is no problem if it is necessary to switch the system off. After switching the system on, automation will provide the necessary washing and all the contaminants will be washed out to drainage because of self-cleaning White Ray SS Hoses with an inner layer made of Teflon®. However, after a long down time it will be necessary to replace some cartridges, depending on tap water quality.

### 8.7. Is it possible to install aromatizers?

Installation of aromatizers is not allowed by the system's construction.

## 9. System's service

### 9.1. How often is it necessary to service the system? What will be done? What is the cost?

Under ordinary conditions the system should be serviced once or twice a year. You should deliver the central unit to our company.

Under production conditions the following operations will be provided:

- Diagnostics of pump's operation, service and replacement of deteriorated parts
- Water pressure and parameter testings at control points

## Appendix 1

### Requirements for the feed water of Universe system

	Parameter	Recommended values (reducing of service interval is eventual)	Maximum values
Requirements for the feed water if Brane Filter is used (Brane Extra as option)	Temperature		5 ... 30 °C
	pH		5 ... 7.6
	Total dissolved solids (electrical conductivity)		200 ... 750 µS/cm
	Permanganate index	1 mg/l	3 mg/l
	Residual chlorine	0.1 mg/l	0.3 mg/l
	Residual ozone	0.01 mg/l	0.1 mg/l
	Total iron	0.1 mg/l	0.3 mg/l
	Total aluminum	0.05 mg/l	0.1 mg/l
	Total manganese	0.05 mg/l	0.1 mg/l
	Silica (by Si)	4 mg/l	10 mg/l
	Silt density index (SDI 15)	1	3
	Turbidity	1 NTU	2 NTU
	Dissolved gases, part of maximum concentration	30 %	50 %
	Total bacteria count		50 cfu/ml
Requirements for the feed water if other Reverse Osmosis System is used (without Brane Filter)	Temperature		5 ... 30 °C
	pH		5.5 ... 7
	Hardness		5 ppm
	Total dissolved solids (electrical conductivity)	2 ... 15 µS/cm	2 ... 40 µS/cm
	Permanganate index		0 mg/l
	Silica (by Si)		1 mg/l
	Dissolved gases, part of maximum concentration	30 %	50 %
	Total bacteria count		50 cfu/ml

The material is presented for informative purposes only.

The manufacturer reserves the right to make alterations in the design, supply set and manufacturing technology for the purposes of improving of the system's technical characteristics.



