



NANOCLEANWORLD®
innovative solutions in hygiene

PIPELINE CLEANING AND WATER DISINFECTION



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LEGAL REGULATIONS FOR THE PROVISION OF ADEQUATE QUALITY DRINKING WATER

IN THE EUROPEAN UNION, IT IS A LEGALLY GUARANTEED RIGHT FOR ALL RESIDENTS OF THE EU TO HAVE ACCESS TO HEALTHY DRINKING WATER.

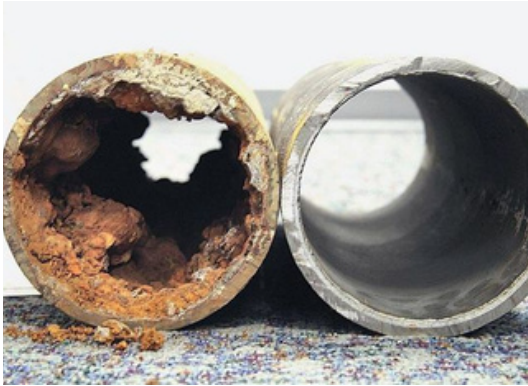
One of the basic conditions of this right:

-  the water base and
-  the drinking water network in appropriate technical condition, which is able to deliver natural mineral water to consumers while maintaining excellent quality.

DIFFICULTIES IN TRANSPORTING DRINKING WATER

Unfortunately, the quality of the drinking water that reaches the consumer is not the same as the quality of the water that reaches the surface at water bases. As the transport distance increases, the possibility of quality deterioration also increases significantly, since the pipeline system itself can become a pollutant in the event of inadequate maintenance, from which various pathogens and deposits can enter the drinking water.

Protecting the quality of water is a fundamental task, which means not only the maintenance of drinking water bases, but also the prevention of quality deterioration that occurs in connection with water transport.



DEPOSITS INSIDE THE PIPE NETWORK:



CAN CAUSE TURBIDITY OF DRINKING WATER

Improving the quality of drinking water increases human lifespan, reduces health risks, and thereby the costs of treating diseases.



THEY ALSO AFFECT THE MECHANICAL PROPERTIES OF THE FLOW

since the decreasing cross-sections result in higher pressure, which is accompanied by higher energy consumption during transport



THEY INCREASE THE RISK OF PIPELINE FAILURE, AND IN MANY CASES THEY ALSO CAUSE PERIODIC WATER SUPPLY PROBLEMS



THEY CAN ALSO FORM A BREEDING GROUND (BIOFILM) FOR SECONDARY BIOLOGICAL CONTAMINANTS THAT SETTLE IN THE DRINKING WATER NETWORK.



BIOFILM AS A LIVING PROBLEM

A significant part of the microbiological problems of water networks is caused by the presence of a biofilm layer formed by bacteria on the inner wall of the pipe network.

The thickness of the coating can range from a few micrometers to half a meter, and several species of bacteria, (pseudomonas, legionella) parasites and nematodes can settle in it, which dissolve in the flowing water and significantly infect the drinking water system.

In many cases, unfortunately, the biofilm protects its "inhabitants" from the disinfection procedures used in general, but in many cases also against shocks with chlorine, acid-alkali or temperature!



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ADVANTAGES OF

PIPE NETWORK

MAINTENANCE, CLEANING AND
DISINFECTION



HEALTHY DRINKING WATER

Through cleaning, high-quality, healthy drinking water can be provided to the population.



INDIRECT COST SAVINGS

The improvement of the quality of drinking water increases the lifespan of a person, reduces the health risks and thus the costs spent on the treatment of diseases.



ENERGY SAVING

On the cleaned section, the cross-section of the wires returns to their original dimensions, so the transport can be solved with less energy consumption.



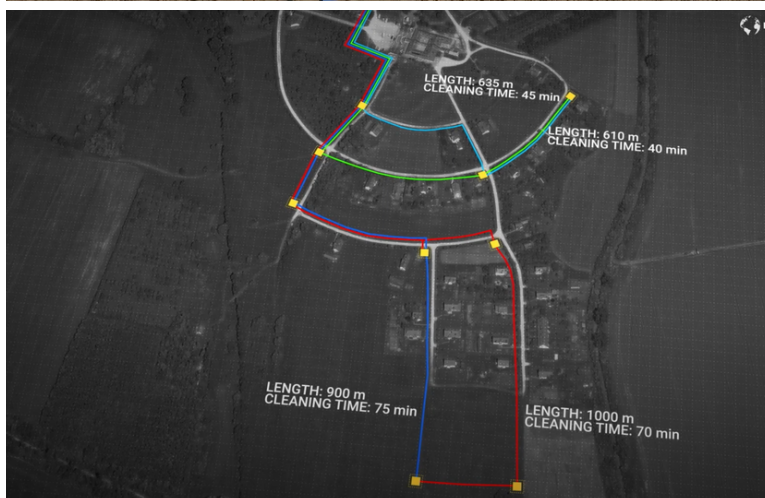
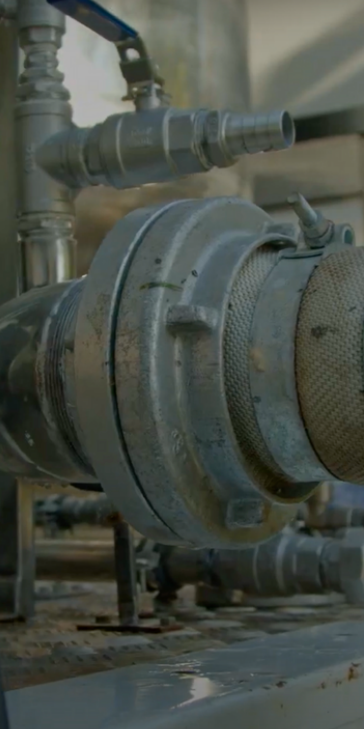
SAVING MAINTENANCE COSTS

Due to the larger cross-section of the cleaned section, drinking water flows with less pressure, which reduces the risk of breakdowns, pipe breaks and damage control expenses.



REDUCING ENVIRONMENTAL IMPACT

The use of piped drinking water may increase, which may also reduce the consumption of bottled mineral water, thus resulting in a reduced environmental impact.



THE SOLUTION

NanoCleanWorld combines unique hydrogel and electrolysis technologies to offer a widely applicable, effective solution for cleaning and disinfecting pipe networks.

THE PROCEDURE SIMULTANEOUSLY USES **SPECIAL**

gel-based mechanical cleaning consisting of food industry raw materials (which can even be used in pipe sections containing pipes of different diameters), as well as

SPECIAL BROAD-SPECTRUM, MULTI-COMPONENT BIO-DISINFECTANT.

ABOUT US

Our company offers to your attention the globally unique, Hungarian-developed, patent-protected technology for the cleaning and disinfection of drinking water networks presented at the Planet Budapest 2021 Sustainability Expo and World Meeting.



PLANET
BUDAPEST 2021

The hydrogel fed into the pipe network consists of food industry raw materials, it decomposes in the open air, and does not produce any harmful substances for the environment, thus reducing the environmental burden caused by logistics. Furthermore, by using our technology, it is possible to ensure quality tap water that can encourage the consumption of drinking water at home, thus displacing the use of plastic bottled mineral waters and soft drinks.

IN ADDITION, WE OFFER A SOLUTION THROUGH OUR TECHNOLOGY:

- for draining pipe networks
- for the protection of pipe networks against corrosion
- as well as devices stuck in the pipe network e.g. for the outlet of cleaning plugs.

All this without breaking the system and the pipe network!

The service we provide is unique because:



COMPLETELY MOBILE



100% ENVIRONMENTALLY FRIENDLY, DOES NOT USE HARMFUL CHEMICALS



CLEANS AND DISINFECTS AT THE SAME TIME

removes the biofilm layer formed in pipe networks and kills the pathogens hiding underneath (e.g. Pseudomonas, Legionella)



FAST, AND WORKS WITH A PRECISELY PREDICTABLE CONSTRUCTION TIME



THERE ARE NO EXTRA LOGISTICS COSTS

as the structure produces the bio-disinfectant on site



COST-EFFICIENT

because it is an excellent replacement for the previously known flushing technology that wastes millions of liters of precious drinking water.

VIDEOS

SCAN THE QR CODES BELOW
WITH YOUR MOBILE PHONE TO
VIEW THE VIDEOS.



**TECHNOLOGY PRESENTATION
ANIMATION**



**VIDEO SHOWING THE
IMPLEMENTATION**

OUR MAIN REFERENCES



COMPARISON OF HYDRO-GEL TECHNOLOGY AND THE TRADITIONAL WATER-SUPPLY SYSTEM CLEANING TECHNOLOGIES

(This comparison is not full and it's indicative. There could be other properties which are not listed here, could not be compared or there are no sufficient data at the moment.)

Technological properties	Hydraulic cleaning					Mechanical cleaning				
	System flush through outlet or fire hydrant	Flushing with added sponge pieces	Flushing with injected compressed air	Flushing with injected, pulsating compressed air	Cleaning with added ice pieces	High pressure water jet cleaning	Chemical treatment and flushing	Cleaning with a pig	Cleaning with sponge	Hydro-Gel technology
Generally known, penetration so far	well known, widespread	well known, not widespread	well known, not widespread	well known, not widespread	little known, not widespread	known, but did not work for the purpose	known, but did not increase risk	well known, not widespread	Well known, widespread	new high technology, with excellent references
Multifunctional method	no	no	no	no	no	no	no	no	no	yes, can be tailored to the individual case*
Need to disrupt system integrity	no	yes, in case of jamming	no	no	yes, in case of jamming	yes, every time	no	yes, every time	yes, most of the time	no
Need for special cleaning joint	not needed	not needed	not needed	not needed	not needed	only works with disrupting the system	not needed	only works with disrupting the system	Needed, or disruption needed	not needed
Risk of jamming	none	in case of small diameters	none	none	increased risk in case of small diameters	cannot be employed	none	present	present	none, cannot cause jams
Passing through narrowing or curves	not applicable	very limited	yes	yes	very limited	no	yes	no	no	yes
Removal of sediments	local	yes	yes	yes	yes	yes	yes	yes	yes	yes
Removal of bacterial membrane	no	slightly	partially	partially	slightly	yes	yes	yes	yes	yes
Removal of lime and strongly adherent materials	no	no	no	no	no	no	yes, depending on the applied chemical, time consuming	yes, depending on the type of pig used	no	no
Range of applicable diameters	not applicable with large diameters	not applicable with large and small diameters	not applicable with large diameters	not applicable with large diameters	not applicable with large and small diameters	not applicable with small diameters	not economical with large diameters	not applicable with small diameters + not economical with large diameters	not applicable with small diameters, not economical with large diameters	can be applied effectively from the smallest to the crawlable sizes
Max. length of cleaning potential	only at the vicinity of the capping	only short sections	only short sections	only short sections	only short sections	only short sections	only short sections	more kilometers even	more kilometers even	Tens of kilometers even
Health risks	none	risk of infection from the outside because of added sponge and disruption	risk of infection from the outside because of the air + secondary contamination	risk of infection from the outside because of the air + secondary contamination	risk of infection from the outside because of added ice and disruption	risk of infection from the outside because of disruption	elevated risk because of the used chemicals	risk of infection from the outside because of disruption	risk of infection from the outside because of disruption	no risks, harmless to health
Disinfection	applied at the center, or with mobile device	separate step after the cleaning	separate step after the cleaning	separate step after the cleaning	separate step after the cleaning	separate step after the cleaning	separate step after the cleaning	separate step after the cleaning	separate step after the cleaning	one step, done together with the cleaning
Long term benevolent effects	none	none	none	none	none	not known	slightly	none	none	inhibits bacteria repopulation
Water conservation	highly water wasting	water wasting	moderately water-saving	moderately water-saving	water wasting	water-saving	water wasting	moderately water-saving	moderately water-saving	water-saving
Wastes need to be treated	none	contaminated sponge pieces	none	none	none	none	used chemicals (hazardous materials)	contaminated sponge pieces	contaminated sponge pieces	none
Known disadvantages so far	highly water wasting, only partial results	risk of infection because of the remaining sponge pieces	the residual air causes bacterial and operational problems	the residual air causes bacterial and operational problems	the residual air causes bacterial and operational problems	not really effective, can only be applied at limited places	medical and environmental risk	risk of jamming, risk of infection due to disruption	risk of jamming, risk of infection due to disruption	there are not known disadvantages

* Mechanical cleaning + disinfection + system exploration, mapping, all at one step!

FREQUENTLY REPEATED QUESTIONS AND ANSWERS

WHAT CAN YOU DO WITH THE HYDRO-GEL AND WITH THE CONNECTING TECHNOLOGY?

The Hydro-gel and the connected new, Hungarian high technology can mainly be used to mechanically clean water-supply systems. Using this new technology it is possible to complete the pipeline cleaning and system upkeep procedures in a simpler and more economical manner, compared to the known techniques. A number of other jobs can be achieved with the Hydro-Gel, see below for details.

WHAT ARE THE COMPONENT OF THE HYDRO-GEL?

The Hydro-Gel is made of harmless components, which are also used in food industry as additional material to various foods.

HOW DOES THE HYDRO-GEL CLEANS?

The Hydro-Gel rubs off and collects the residual materials from the pipes and from the inner walls of pipelines. The gel itself has a huge surface, so it can collect almost all residue. The collected wastes exit the system along with the gel.

WHAT IS A "GEL-TRAIN"?

We use different property gels for different cleaning purposes. For example, high viscosity "pushing gels" rub off rough wastes, the more diluted "pick-up gels" collect more loose materials inside. Between individual "gel plugs" we can deliver disinfectants, this way we complete the mechanical cleaning and the disinfection is one step! The different types of gel plugs travel inside the pipelines like the carriages of a longer train, this is called a "gel-train".

HOW LONG IS A "GEL-TRAIN"?

The setup of the "gel-train" is always done according to local circumstances and needs. The usual length of the "gel-train" is 30-70m. (Please note, that the length of a single sponge plug is minimal compared to the gel, approx.. 1m long.)



FREQUENTLY REPEATED QUESTIONS AND ANSWERS

HOW DOES THE HYDRO-GEL BEHAVE IF IT ENCOUNTERS A DIAMETER NARROWING?

The Hydro-Gel – thanks to its positive viscosity and elasticity properties – fills the available space completely, and therefore takes on the shape of the pipeline at all times. It does not get stuck at corners, at narrowing diameters or at the location of devices (imagine a half closed gate valve, for example).

HOW DO YOU CONTROL THE GEL INSIDE THE SYSTEM?

The gel advances due to the effect of water pressure, navigation is achieved using the existing valves.

WHAT KIND OF PIPELINE DIAMETERS CAN BE CLEANED WITH THE HYDRO-GEL?

The Hydro-Gel can be used with the usual diameters of drinking water-supply systems: from the small diameter service pipes to largescale, crawlable transmission lines. In case of the mostly occurring diameters of DN25-300 mm the operation is a routine, and plans need to be done in case of bigger diameters.

HOW FAST THE GEL TRAVELS INSIDE THE SYSTEM?

The gel travels with the same speed as the water, depending on the applied water pressure. This is usually 0,5-1 m/s.

IS THERE A PROBLEM IF THE GEL GETS INSIDE THE USERS' SUBSYSTEM?

Randomly it can occur, that during the cleaning operation – despite the prior notification of the users – someone opens some taps and the gel gets inside the local service line. Since the Hydro-Gel does not contain any harmful materials, this will not cause any problems at the end-user, will not cause any jamming, and after the cleaning process the user only needs to let the gel through the tap, until there is clear water flowing.



FREQUENTLY REPEATED QUESTIONS AND ANSWERS

WHERE CAN YOU DEPOSIT THE USED GEL, ARE THERE ANY WASTES GENERATED WHICH MUST BE TREATED?

Since the used gel does not contain any harmful materials, it can be ejected to a public sewer. After the cleaning process is finished the gel will break up into pieces, and will not cause any jamming in the sewer. In case there is no sewer available, the gel can be ejected to an open ditch or to an appropriate neutral area. The gel will decay within a few days, without leaving any waste that needs further treatment.

CAN YOU DISINFECT THE SYSTEM USING THE HYDRO-GEL?

Yes, the disinfectant can be diluted into the Hydro-Gel material, but we suggest using nano-fluids to disinfect. The nano-fluids can be transmitted between gel plugs (in a gel-train), and it has a proved bactericidal effect.

DOES HYDRO-GEL REMOVES LIMESCALE FROM THE PIPELINE?

The Hydro-Gel can primarily remove the loose, adherent contaminations (sediment, bacterial layer). In case of strongly adhered limescale and other mineral secessions it is expedient to use high frequency cleaning methods. Using this method it is possible to remove these strongly adherent residues from industrial heat exchangers without major structural works. This way we can save time and money! Please contact us if you need further assistance in this subject!

WHAT ADDITIONAL TECHNOLOGIES CAN BE COMBINED WITH THE HYDRO-GEL TECHNOLOGY?

The Hvdro-Gel can be combined with technologies other than the nano-fluids. Our newest development is a miniature device called the Pipe-Finder, which travels along with the gel and maps the system and provides further useful technical data from the operation.

Another new development is the Pig+Gel technology, which can be employed during video surveillance of the inside of pipelines. During this operation a special type of pig is being moved with the Hydro-Gel at a constant speed, in order to achieve the best video quality. This technology can be used to economically and successfully provide the inside surveillance of hydrocarbon pipelines also.





GB UNIVERSAL WATER DISINFECTION SYSTEM

NanoCleanWorld GB Universal provides clean water in an environmentally friendly manner with minimal operating requirements and low energy consumption. It destroys harmful microorganisms, bacteria, viruses, and fungi already present in plumbing systems, and prevents the formation of the biofilm layer responsible for their adhesion and proliferation.

Drinking contaminated water entering the drinking water system of public institutions or inhaling water vapor full of pathogens during washing up poses a critical risk to the human body.

Antibiotics used in hospitals are often no longer effective against the increasingly common multi-resistant bacteria and infections, such as Legionella.

The installed water disinfection equipment uses ordinary salt and electricity to produce a disinfectant liquid consisting of several oxidants at the point of use, which, thanks to its complex composition, destroys viruses, bacteria and fungi extremely effectively, even against viruses and bacteria that are resistant to traditionally used chemicals.

The disinfectant exerts its effect in such a way that it destroys the cell membranes of viruses, bacteria and fungi, as a result of which resistance cannot develop. It has a longer effect than traditional procedures.

AREAS OF USE:

- For the disinfection of human drinking water (e.g. the replacement of highly toxic chlorine gas), or for post-disinfection
- For disinfecting hot water and cold water systems (e.g. against legionella bacteria, hospitals and other buildings and sites).
- For waste water treatment (compliance with emission limit values)
- Can be used to disinfect surfaces and air conditioners (hotels, office buildings, places with public traffic)
- For treating the water of swimming pools and spas (to replace chlorine gas, thus avoiding the smell of chlorine and allergies caused by chlorine).
- Agriculture - animal husbandry (disinfection of drinking water for animals, disinfection of stables and other agricultural equipment)
- In food processing
- A mobile unit can also be created in case of emergencies (healthcare, military use, disaster protection)

The equipment is equipped with a remote monitoring and remote control system, thanks to which it can be monitored and controlled online, thus enabling real-time water quality control.

Our equipment can be inserted easily, extremely quickly, without modification, even into existing systems that are even 100 years old, and can also serve as a supplement to existing disinfection procedures or as a replacement for them.

ADVANTAGES:



The disinfecting liquid produced is a biocide so it is not classified as a chemical



The regulations on the storage and use of chemical substances do not apply to it



Administrative tasks related to operation are minimal. Neither operation nor installation requires a permit.



It is cheaper than alternative solutions, both in terms of investment and operation



The disinfecting liquid breaks down into its elements, so no harmful residual substances remain



It is environmentally friendly compared to other currently used solutions and can be operated in a sustainable manner in industrial areas as well.



TECHNOLOGY
PRESENTATION
ANIMATION

TECHNOLOGY PRESENTATION ANIMATION

"According to the legislation, it is mandatory, among other things, to free the domestic hot water of public institutions from Legionella in accordance with EU regulations."

NanoCleanWorld GB Universal technology is a solution for the proper disinfection of water on site.

Parts of the system: PICTURE - diagram (see above)

The excess disinfecting liquid produced by the equipment can simply be drained off and used to disinfect the surfaces of the building by adding it to the mopping water, or by spraying or misting it out.




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COMPLEX HYGIENE SOLUTIONS FOR HEALTH PROTECTION

surface and air technology disinfection, cleaning and disinfection of drinking water networks, food, pharmaceutical, oil and gas industry pipelines

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