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HYDRO-GEL TECHNOLOGY FOR CLEANING AND DISINFECTING PIPELINES

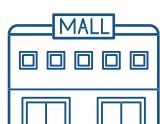
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Plázák



Kórházak



Mozik



Irodaházak



Iskolák



Gyárak



Repterek



Közösségi terek

Short introduction



The first steps made in the lab of the Szeged University



The inside cleaning and disinfecting of water-supply systems is a recurring problem of system operators. The mechanical and hydraulic solutions used so far are usually not economic, time consuming and the achieved results are not always the best. The Hydro-Gel high technology developed by OKFT Ltd. can remove the residues from the pipelines easily and it does this in a cost effective manner. This environmentally friendly technology can be applied in drinking water-supply systems, since it does not contain any harmful materials. In this expository you can find most of the information regarding this new technology.





Historical overview

There are several different methods of cleaning pipelines, which can be employed with more or less success, according to the field experience.

The most widespread solutions are usually mechanical cleaning, for example pigging, or using sponges. Loose wastes are usually washed out by hydraulic flushing.



The jammed sponge can only be removed by disruption

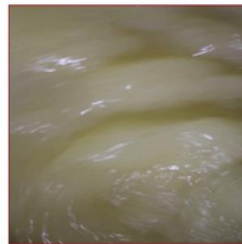
All methods have their own drawbacks: during the mechanical cleanings the pigs or sponges often get stuck and cause jams.

Hydraulic flushes mean you have to calculate with extensive use of water, which goes wasted.

In order to manage this problem we developed special gels, first for the oil industry, which made the inside cleaning of hydrocarbon transmission lines much more simpler and effective.

Starting out from here, OKFT Ltd. and the Szeged University together developed an environmentally friendly gel, which can be safely used in cleaning of drinking water- and industrial water-supply systems.

The most important traits of the Hydro-Gel technology



The gel developed by OKFT Ltd. is a water based gel, which does not contain any hazardous materials, and it is completely environmentally friendly. Thanks to these properties it can be safely

used to clean water-supply pipelines. The gel – as an effect of the water pressure – travels all along the pipeline as a plug and fully takes the inside shape of the line. It can even collect residues from the remotest little cracks.

According to the job to be performed we can use different types of gels: „pushing gels” removes the rough wastes, „collector gels” on the other hand collects the loosened particles. During the process of cleaning we create „gel-trains”, where the individual “carriages” can perform different jobs.

The gel-trains are always assembled to fulfil the given tasks for example it can contain different viscosity and functional gels, disinfectants or such small devices, which can exactly map the



„Gel-train” assembly made from different types of gels

underground pipeline system. Using this new high technology we can deliver a complex solution to maintenance issues, even in one simple step. The cleaning job employing the Hydro-Gel is very simple, extremely cost effective, we recommend it to all system operators!



FREQUENTLY ASKED QUESTIONS (FAQ) AND ANSWERS REGARDING THE HYDRO-GEL PIPELINE CLEANING TECHNOLOGY

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 already known techniques. A number of other jobs can be achieved with the Hydro-Gel, see below for details!

What are the components 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 the individual „gel plugs“ we can deliver disinfectants, this way we can complete the mechanical cleaning and the disinfection in 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 30-70 m. (Please note, that the length of a single sponge plug is minimal compared to the gel, approx. 1 m long.)

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).

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 DN 25-300 mm the operation is a routine, and plans need to be done in case of bigger diameters.

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.

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 enduser, will not cause any jamming, and after the cleaning process the user only needs to let the gel out through the tap, until there is clean water flowing.



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What type of operator assistance is needed during the Hydro-Gel cleaning?

We need operator assistance during the planning and during the cleaning operation. The operator is tasked with providing input and output points, opening and closing valves, notifying users of the upcoming cleaning, and providing further fixing work on the system. We provide experts to help with all types of technological operations. (Based on a prior agreement, we can provide the necessary fixing works, under the operator's supervision.)

Is there any Gel residue left inside the pipelines?

The Hydro-Gel is not soluble in water, it does not stick to the pipe's walls and all of it will exit the system after the cleaning. This fact is based on actual experimental data.

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.

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!

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.

What additional technologies can be combined with the Hydro-Gel technology?

The Hydro-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.

Does the Hydro-Gel technology have official licenses?

The Hydro-Gel and the Hydro-Gel technology has OTH (National Public Health Association) licens, identification number: KEF-22881-2/2014.

Is the Hydro-Gel technology free to use?

The Hydro-Gel high technology developed by Olajipari Karbantartó Fejlesztő és Tervező Ltd. (OKFT Ltd.) is protected by hungarian and international patents. The inventor and manufacturer has exclusive rights of this technology, and third parties cannot be apply it without the prior license of the owner. In case you are interested in this new technology, please do not hesitate to contact us, we are open to cooperation with mutual benefits!

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 work due to increased 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 tapping	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)	none	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	not really effective, risk of jamming	not cost 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!