At the end of the tubing everything must be well

Disinfection and cleaning of standpipes and backflow preventers with new innovative rinsing, disinfecting and testing equipment from BEULCO using an LDT Dosatron proportional dispenser

Drinking water must be free from pathogens and must not have any harmful properties. Drinking water should be appetizing and stimulate enjoyment. It should be colorless, clear, cool, odorless and tasteless. Based on these guiding principles of the Drinking Water Ordinance (TrinkwV 2001), the drinking water treatment and water treatment processes are carried out with enormous technical effort, in order to provide consumers with high quality drinking water via the public drinking water network. And this is necessary at all water collection points, whether in private households, in public facilities, in factories or at events. While consumers in Germany can be sure that their water suppliers supply safe and reliable drinking water, the responsibility for the drinking water quality at the transfer point, according to the Drinking Water Directive 2001, is the responsibility of the operator or owner of a drinking water system.

However, some incidents in the past few years have shown that not all operators have taken the responsibility for the cleaning and disinfecting of the water-carrying equipment and apparatus. Microbiological contaminations with bacteria, such as legionella, pseudomonas, colibacteria, enterococci, clostridia and many other germs have occurred, which grow in the so-called biofilm. The formation of the biofilm is carried out inter alia by the following influences:

- deposits in boilers and pipes
- too low flow
- stagnation in vacancy, school and working holidays or conversion measures
- not removed or unknown dead lines / stagnation lines
- dead spaces in seals, shut-off valves, slides, etc.
- incorrect installation and maintenance of the house installations

Mobile drinking water supply with standpipes

Special attention is therefore given to the mobile drinking water supply, on popular festivals, markets or temporary jobs on construction sites, using standpipes and system separators. Compliance with drinking water hygiene is also important in water supply, e. g. for coaches, ships or when taking over water at airports, as well as for the water supply by means of water vehicles from the Military Forces, Official Technical Service and fire brigade.

These mobile and time-limited water supply points, despite the seemingly professional installation, carry serious and often dangerous risks because both the mobile system and the entire public drinking water network can be contaminated by the unfortunate impact of various factors and lead to costly actions to prevent contamination with bacteria.

By the frequent delivery of standpipes for different applications, the standpipe and its individual parts, such as system separators and water meters, come into contact at different locations and with different types of water. The operating conditions (set-up, use and dismantling) can have an influence on drinking water quality.

Temperature fluctuations, solar irradiation and driving over of the hoses also stress the pipes and can thus become risk factors, since there is the possibility of water contamination.

Figure 1: Cleaning water after a hose cleaning with sponge balls (left); Not in that way! (right)

Innovative rinsing, disinfecting and testing system

As a rule, standpipes and system separators are cleaned, disinfected and stored by water utilities or municipalities. However, it may take some time before they are re-used and there is a risk that they will become contaminated again if they are not properly stored.

In particular, the cleaning and disinfecting of hoses is usually given little attention. Here, too, a biofilm can quickly form, which provides a good breeding ground for various kinds of bacteria and germs. Last but not least, the human factor also holds a risk that cannot be underestimated, since especially in the area of mobile drinking water supply, adventurous hose constructions are often used (**Figure 1**). This is to avoid the risk of contamination of the water supply system by contamination with non-drinking water.

The cleaning and disinfecting of standpipes, backflow preventers and drinking water hoses are therefore of the utmost importance and must be carried out before re-use. The German company BEULCO GmbH & Co.KG from Attendorn, in cooperation with a hygienic service provider from Paderborn, has developed an innovative and highly efficient rinsing, disinfecting and testing system that supports drinking water hygiene in a sustainable manner (**Figures 2, 3**).

The system is versatile both stationary and mobile. It is used for cleaning and disinfecting standpipes, water meters, drinking water sub-distribution, backflow preventers, drinking water hoses, sales stands on popular markets and markets or house installation. At the same time, standpipes can be tested for functionality and the annually prescribed test of system separators can be carried out. The equipment can be used e. g. by the water supplier for a quick post-cleaning of the stored standpipes, while the installation at site can quickly and effectively carry out a disinfection and cleaning of the drinking water hoses. Because the system does not require an electrical connection, the cleaning takes place directly at the water transfer. The hoses are cleaned until the water, which e. g. is to be used in a sales stand, reaches a redox value of 650–700 mV at the water tap.

The advantages of this disinfection method and the test system are convincing more and more users and the interest in this is also increasing in the municipal offices, e. g. at the town of Detmold, Germany. Since the beginning of 2017, a BEULCO disinfection system has been installed here and the results are extremely convincing. The cleaning result of the previous cleaning method, by simple manual cleaning, rinsing with water and functional check of the water meter, was never quite satisfactory and a more effective method was necessary. This has been found in the new standpipe disinfecting system and the disinfectant BEULCO Clean.

A further advantage is the non-electric LDT Dosatron proportional dosing pump, which allows the disinfection system to be used outside the workshop without the hassle of an electro cable. Since no current is required, no water meter with pulse counter is necessary.

The uncomplicated and fast disinfection process with subsequent redox measurement ensures safety and also satisfied customers, who now have the certainty of borrowing a disinfected and clean standpipe. In the future, the municipal office

Figure 2: Mobile cleaning and disinfecting system

Figure 3: Stationary and mobile rinsing, disinfecting and testing equipment

Figure 4: Operating principle of LDT Dosatron

of Detmold will see a further improvement in the storage of results in a data logger to digitize the stand management.

LDT Dosatron Proportional Dosing Pump works without electricity

An important component of this system is a proportional dosing pump from LDT Dosiertechnik GmbH located in Hamburg which dispenses the cleaning and disinfecting agent, proportional to the water throughput, directly to the water flow. Connected to the water network, the dosing pump uses only the water pressure as the driving force. No electrical current is required.

A proportional dosing system, e. g. LDT Dosatron (**Figure 4**), works with a volumetric hydraulic motor and enables the continual injection of the liquid or soluble concentrate. Connected to the water supply system, the Dosatron's only driving force is the water pressure. The concentrate is drawn in independently and mixes with the drive water. The resulting solution flows through the Dosatron. The dosing quantity always stays proportional to the water throughput, as per the manually set dosing rate, even if there are throughput or pressure fluctuations in the water supply system. The pipe lengths have no effect on the dosing accuracy either, allowing the unit to be installed wherever required

The proportional dosing system combines the functions of a water meter, dosing feeder and mixer in a single unit. The continuous and immediate mixing in the dosing system's mixing chamber is a particular feature that ensures a homogeneous and ready-to-use solution for immediate use, e. g. for applying a disinfecting and cleaning solution.

The high dosing accuracy and reproducibility of +/- 3% (according to the API 675 standard) is an economic advantage for the operator, as more highly concentrated media can be used. The design does not allow overdosing to occur.

In addition to the economic arguments and advantages, the materials used also play a crucial role. To ensure high resistance against the dosing liquids, the dosing system housing is made from special polypropylene (polyacetal, HT). For highly concentrated, aggressive acids and bases, an optional housing made from PVDF can be used.

Thanks to the simple design of the proportional dosing system, with just a few components, the unit is very maintenance friendly and easy to handle.

BEULCO Clean disinfectant for drinking water

The disinfectant BEULCO Clean is purely biological and is produced from water, salt and electricity in an electrolytic process (membrane cell electrolysis). It is neither toxic nor corrosive.

Compared to other methods of disinfecting drinking water, whether chemically e. g. with chlorine dioxide, chlorine bleaching liquor, peroxide compounds, or by means of UV irradiation, ultrasound treatment or thermal treatments, no disadvantages are known with BEULCO Clean.

The advantages are:

- permanent destruction of the biofilm
- fast and timely efficiency with depot effect
- less time required for disinfection, since no rinsing or dwell time is necessary
- economical in consumption, approx. 3ml / liter
- disinfects the entire pipeline system, including collection points
- high energy saving potentials due to temperature reduction
- high efficiency even at low temperatures and cold water
- no special staff training required
- no dangerous goods, since it is not a chemical
- official approval for human consumption
- odorless and tasteless
- without harmful side products
- neither toxic nor corrosive

It is already widely used for drinking water hygiene in schools, sports halls, hotels, hospitals and retirement homes. Likewise, in the commercial service water range, e. g. in the food industry, chemical industry, air humidification systems and air conditioning, ballast water tanks for ships. In agrarian culture it is used for example in horticulture, agriculture, flower cultivation and vegetable growing.

Conclusion

Clean water is a vital source for every consumer. It is provided by the water suppliers in high quality. Therefore, it is extremely important that the downstream equipment and fittings have the appropriate quality, too, and are sufficiently cleaned and disinfected so that the clean water is not contaminated again. Hereby the BEULCO rinsing, disinfecting and testing system with the LDT Dosatron proportional metering pump is supporting in an innovative, efficient and sustainable manner. If all is well, also the end (of the hose) is well.

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