

# **AQUACALK EQUIPMENT**

## ***Description of the problem:***

The input water contained hardness of water (ions of calcium and magnesium dissolved in water) has a tendency for the extraction of undissolved compounds of calcium and magnesium (mainly carbonates) in tubes, on the surface of heat exchanges (heating spirals, bodies, etc.), or on the surface of solid materials (floor tiles, fittings, water taps, etc.) in the form of sediments which are difficult to remove using standard means.

The problem is not "only" aesthetical, but also technical (blocking of distribution lines) and functional (blocking of the passage of the heat in the exchangers).

## ***Water treatment methods:***

For water whose hardness exceeds a certain limit (more than approximately 2.5 mmol.l<sup>-1</sup>, i.e. 14°N) it is recommended to treat such water so that calcium and magnesium ions do not create the sediments which were described above.

The basic procedures are the softening of water (replacement of cations/including calcium and magnesium/with sodium ions by means of ion exchangers and regeneration of the bed by sodium chloride), or the adding of solutions masking the hardness of the water (solutions of the type CALGON, EPURO, polyphosphates, etc.) and physical methods (magnetic water treatment, activation by the passage through polymetallic equipment and other procedures).

## ***Softening of water:***

The "traditional" water softeners work on the basis of ion exchange where calcium and magnesium ions are replaced in the water by the equivalent volume of sodium ions. When the ion exchanger is exhausted it must be regenerated by a salt solution. For example, in the case of the regeneration of 100 litres of softening resin, it is necessary to use about 25 kg of salt per one regeneration cycle.

## ***AQUACALK Equipment:***

**AQUACALK** equipment offers a method of water treatment used for removing existing deposits and for the protection of systems against the origination of new scale deposits. The effective component of **AQUACALK** equipment is the medium DESCAL which by its catalytic effects causes the removal of old deposits of boiler scale from distribution lines, heat exchangers and firm surfaces and protects this system against further sedimentation.

The use of **AQUACALK** equipment does not require any operating costs. As it concerns a clean catalytic process, the operation does not require re-washing or salt for regeneration. Costs for the installation of **AQUACALK** equipment are lower than in the case of traditional softening stations. Carbonate hardness

(part of the hardness of water which can be separated as calcium - magnesium carbonates) is transformed into dissoluble heat-resistant crystals. These crystals remain in water as small particles with the size of a nano up to micro meters and they do not have the ability to settle in distribution lines (tubes), on heat exchangers (heating spirals), or on the surfaces of firm materials (water taps, tiles). **AQUACALK** equipment reliably protects your household devices (dishwashers, washing machines, coffee machines, boilers, heaters, etc.) against solid sediments of scale.

**AQUACALK** equipment can be used for removing scale in bathrooms where each water drop after drying remains as typical sediment with difficult to remove minerals. Instead of this, in critical places there is a thin film of white powder which is simply removed by a cloth or sponge.

Aggressive chemical agents for the cleaning of affected places will not be necessary and the shower head will not be blocked.

Another advantage is the fact than unlike the water softening, calcium and magnesium remain in water. The sodium content in the treated water is not increased which means that there is no health risk for people with hypertension or cardio-vascular problems. The water remains very healthy.

## ***Frequently asked questions concerning AQUACALK equipment:***

### ***How does AQUACALK equipment work?***

**AQUACALK** equipment contains the active medium **DESCAL** with crystallic micro-areas with templates for the growing of crystals on their surface enabling to grow crystals with dissoluble calcium-magnesium compounds. When the crystal achieves the size of several micrometers, it is separated form the area and is carried by the flowing water. These crystals are resistant to heat and do not have tolerance to produced sediments.

### ***Where is it possible to use AQUACALK equipment?***

Examples of applications: Houses, flats, distribution lines and boilers, cooling towers, hospitals, pharmacy, preparation of beverages, irrigation systems, boiler rooms, treatment of water prior to membrane processes, industrial enterprises, laundries, hotels, etc.

### ***Is the functionality of AQUACALK equipment renewable after the expiration of its service life?***

The term "renewable function" is used in relation to equipment where the catching capacity of various materials is used in filters which lead to the misunderstanding. As the catalyst medium, **DESCAL** does not have any consumption because this medium serves only as a catalyst for the transformation of elements of water hardness into the form of dissoluble crystals. The medium **DESCAL** is not regenerated.



The use of the medium **DESCAL** was tested during two years of activity and at present there are tests to ensure any possible changes of functionality of the medium **DESCAL** at the time.

### ***Is it possible to test the function of AQUACALK equipment?***

Testing of water hardness without treatment and water treated in **AQUACALK** equipment does not make sense because the chemical indicator reacts to both forms of water hardness and measured water hardness is the same for both waters.

In practical use it is possible to find several examples that water treated using **AQUACALK** equipment reports effects as soft water: soap produces better foam, white spots are not fixed on tiles and can be easily removed as white powder and washing machines consume less washing powder.

The effect of the treatment can be professionally proven by boiling water in the vessel up to the evaporation of water. Remainders are not created from hard sediment, but it is possible to easily remove them by wiping out the vessel.

### ***Is AQUACALK equipment approved for the treatment of drinking water?***

**AQUACALK** equipment and the active medium **DESCAL** were tested by the State Health Institute in the Czech Republic for contact with drinking water and a Resolution was issued under **ref. no. CHŽP: 93/08 EX 080256** that the equipment meets the requirements for products which are in permanent contact with drinking water.

### ***What are the differences between AQUACALK equipment and the so-called physical methods of the change of scale working on the principle of electric current or magnetic water treatment?***

Reputable experts in the area of water treatment rejected over many years the use of new or alternative technologies because the efficiency of these processes for the treatment of hard water was disputable and in most cases the technologies failed. Some products were funny (e.g. the transformation of scale by means of cosmic radiation) and in most cases they were presented by untrustworthy people. At present, on the basis of detailed testing and wide analyses it is known that water treatment processes very much depend on the composition of the input water. And so, in some cases the selected processes function, however, in some cases they do not.

**AQUACALK** equipment converts scale **in all cases**, irrespective of the quality of water. **AQUACALK** equipment functions on a **scientific explainable** and **repeatable** principle. No electric current is necessary.

### ***What is the maximum temperature for use in AQUACALK equipment?***

The temperature of the input water should not exceed 50°C. This temperature is stated by the resistance of the materials used in pressure vessels. **The maximum temperature for the medium DESCAL is 65°C.**

The treated water can be heated up to 100°C, because the crystals created are resistant to high temperatures.



***What are the advantages of AQUACALK equipment for dish washers and washing machines in households?***

By using **AQUACALK** equipment, it is not necessary to use special means for the suppression of water hardness. Built-in water heaters (heating spirals) will be cleaned and old sediments will be removed and will remain clean.

***Is there any health risk when using water treated with AQUACALK equipment as drinking water (including the preparation of tea, coffee, or soda water)?***

No. Water treated with **AQUACALK** equipment is not released from calcium and magnesium ions. These ions are released in the form of dissoluble crystals in the human stomach due to stomach acids and they can be available to the organism.

During the preparation of tea, on the surface of the liquid there will not be the usual shiny film which is originated by a reaction to hard water. Nevertheless, the pleasant good flavour of the water giving the tea the right consistency remains. The preparation of soda water is not influenced by this water treatment.

***What is the effect of AQUACALK equipment on old pipes?***

In old distribution lines in areas with very hard water there is a problem reflected, among others, in the increase of the creation of scale in tubes. In addition, in the tubes there are sediments from corrosion and corrosive products.

As soon as these sediments are intervened by water treated by **AQUACALK**, they are gradually released and pass through the water taps, aerators and shower heads. This problem is resolved by the occasional cleaning of these parts. After cleaning the distribution lines, the problems disappear.

***Is water filtered by AQUACALK?***

No, **AQUACALK** equipment is not a traditional filter. The **AQUACALK** system does not catch the hardness of water and does not change for other ions as in the case of traditional softening filters. **AQUACALK** equipment functions in such a manner that the active medium **DESCAL** functions as a catalyst which activates the process of the creation of micro particles insoluble compounds of calcium and magnesium.

The input water flowing into the **AQUACALK** equipment always flows in the counter-flow direction (upward) through the medium **DESCAL**. The medium **DESCAL** is always uplifted when water flows through **AQUACALK** equipment, so it does not concern traditional filtration.

***Are bacteria reproduced in AQUACALK equipment and is it necessary to regularly disinfect the equipment?***

No. As the equipment operates in a counter-flow manner, during the flow of water it is always uplifted and the catching of bacteria on the medium **DESCAL** is very restricted. Disinfection of **AQUACALK** equipment is not necessary.

### ***What is the influence of water hardness on the function of AQUACALK equipment?***

The basic technical data (max. output of equipment) is stated for water with a maximum hardness of 25 °N (about 4.5 mmol/l). Approximately 80% of installations are classified in this category.

If the user has input water with a higher hardness, it is necessary to select **AQUACALK** equipment with a higher output. The reason is that the speed of flow (and the time of the contact of treated water with the medium **DESCAL**) is stated for a certain hardness of water. If the treated water is with a higher content of substances which caused the hardness of water, it is necessary to ensure optimal conditions for the creation of micro particles. It is possible to do this by decreasing the flow speed or the increase of the size of the **DESCAL** equipment.

Due to the fact that maximum flow is selected according to the demand in the place of application, it would not be purposeful to restrict consumption of treated water. Therefore, it is better to design the site for the equipment so that the water treatment is performed optimally without restriction.

### ***What should the pH of the treated water be? Which limits of pH water values are permitted?***

AQUACALK equipment operates within the range pH 6 – 9. The use of water with a pH value lower than 6 requires a pilot test for efficiency. The pH of water for drinking purpose should fulfil the respective standards.

### ***Is it possible to prevent flushing of the medium from the unit when the equipment is in the first operation?***

It is always possible to recommend dipping the medium **DESCAL** in **AQUACALK** equipment in water for about 15 minutes before the first use. This will ensure that the medium is saturated water and that medium will not be collected on the top of vessel after filling with water. To prevent washing out of the medium into the waste, there is a catching basket mounted on the top of unit which prevents the outflow of the medium into the waste.

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