

Softening at Store Heddinge Waterworks

Danwatec, Denmark



Client
DANWATEC
Dk and -Vestjylland

Location
Denmark

Completion
2017

Project Manager
Arie van Lit, Royal HaskoningDHV
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Services

- Basic Engineering
- Start up and commissioning

Area
Drinking water
230,000 m³/year



Situation

Danwatec provides services and solutions for small and medium-size waterworks in Denmark. Danwatec recognized the added value of the Crystalactor® from Royal HaskoningDHV, as a suitable solution for reduction of hardness in potable water. Store Heddinge waterworks – located south of Copenhagen, Denmark – decided on the purchase of the Crystalactor® from Danwatec.

The groundwater at Store Heddinge Waterworks contains significant amounts of calcium and magnesium. The natural hardness of produced drinking water is in the range of 22–24°dH. The target was a 60% reduction of hardness in produced drinking water. With the approval from the local council, the plant was the first in the country to produce potable water at 10°dH. Prior to this, a long period of evaluation and communication with different actors, from those responsible for water production, to end-users, was necessary to ensure a high drinking water quality complying to the Danish legislation and that overall costs remained as per budget.

The design of the Crystalactor® was based on a capacity of 38 m³/hour, enabling a hardness reduction from 22-24 to 8°dH in the system outflow, which corresponds to the removal of 80–100 mg/ltr. of Calcium in the reactor.

The softened raw water is pumped directly to two sets of ordinary sand filters for traditionally biological filtration

The Project

In 2016, Royal HaskoningDHV supplied Danwatec, with remote start-up assistance, and a Basic Engineering Package for the Crystalactor® for softening of drinking water. Preliminary research and final construction of the plant was executed by Danwatec.

Solution

The first pellet softening plant on Danish soil, started officially producing soft water in June 2017, resulting in a widely valuation by the consumers. The feedback consists amongst others:

- In general, they are satisfied with the softened drinking water, even though there were initial concerns.
- Noticeably reduced scaling problems in household appliances and industrial applications.
- Lower consumption of soap and detergent powder.
- A slight notable change in the taste of the drinking water in the beginning, but this has not been mentioned since.
- The total savings in a household are estimated to be 2 to 4 times the increased cost of softened drinking water.

The water works experienced direct savings by applying the pelleting reactor, because of decreased iron levels before filtration by 40% approximately. These reduced levels will lead to a decrease of produced back-wash sludge resulting in low operational expenditures.

The lime pellets are added as agricultural material, but can also be used as chicken feed, fill in road materials, etc.

*See-through fabricated Crystalactor® in operation at
Store Heddinge Waterworks*



*Water quality parameters before and after applying
Crystalactor®*

	Before	After
Kim 22 [CFU/ml]	<1	2*
Kim 37 [CFU/ml]	<1	<1*
pH	7,2	8,0
Conductivity [mS/m]	81	71,3
Hardness [°dH]	22	8,7
Turbidity [FTU]	0,28	0,25
Ca [mg/L]	120	35
Mg [mg/L]	21	16
Na [mg/L]	16	89
Fe [mg/L]	<0,01	0,06
Bicarbonate [mg/L]	351	262
Ammonia [mg/L]	<0,02	<0,02
Nitrite [mg/L]	<0,002	<0,002

* without using temporary UV treatment



Crystalactor
a product of Royal HaskoningDHV

