

## MSc research

### Subject

Use of grinded calcite as seeding material in the pellet softening process

### Introduction

In the Netherlands, water is softened in drinking water treatment using pellet reactors. In this process a chemical base is dosed (caustic soda, lime or soda), resulting in a shift in the calcium carbonic acid equilibrium and spontaneous crystallization of calcium carbonate.

The pellet reactor consists of a cylindrical vessel. Water is pumped in an upward direction through the reactor at a velocity varying between 60 and 100 m/h. Raw water and the base are injected into the bottom of the reactor. In the reactor seeding material is present: river sand or garnet sand. Due to the high upward velocity the seeding material is fluidized. At the surface of this seeding material the crystallization takes place.



Figure 1. A full scale pellet reactors at the drinking water treatment plant "Weesperkarspel" of Waternet

A disadvantage of the use of river sand and garnet sand as seeding material is that the reuse of the pellets (e.g in the glass industry and paper industry) is difficult due to impurities (Fe). An alternative is the use of calcite as seeding material (Calcilit KA). Experiments have shown that pellet softening with calcite results in a good water quality, but the costs of this seeding material are rather high.



Figure 2. Full grown pellets

**Objectives and approach**

In experiments the use of grinded calcite as seeding material in the pellet softening process will be examined. In previous research it was shown that softening pellets with a calcite nucleus can be grinded to seeding material with the desired diameter. This makes it possible to reuse pellets in the softening process at affordable costs. In pilot plant experiments and in a full scale experiment the use of grinded calcite as seeding material will be tested to find the optimum process conditions.

**Expected results**

The research should result in the optimum process conditions for softening with grinded calcite as seeding material. Also the economics should be evaluated.

**Supervision and support**

Prof.dr.ir. Jan Peter van der Hoek MBA

Ing. Eric Baars (Waternet)

**Contact**

Prof.dr.ir Jan Peter van der Hoek MBA

Phone +31 6 48262075

Email [jan.peter.van.der.hoek@waternet.nl](mailto:jan.peter.van.der.hoek@waternet.nl) / [j.p.vanderhoek@tudelft.nl](mailto:j.p.vanderhoek@tudelft.nl)