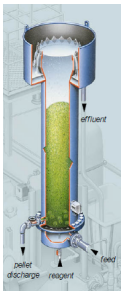

Aquatec Maxcon, through its relationship with Royal HaskoningDHV BV of the Netherlands, offers Crystalactor® technology for advanced water and wastewater treatment.

The Crystalactor® is a fluidised-bed type crystalliser. Contrary to conventional water treatment processes, the cost-effective crystallisation method of the Crystalactor® creates a valuable by-product instead of waste. The technology is applied in both domestic and industrial applications for water softening and for the removal of recovery of phosphates, fluoride and heavy metals.

Fluidised Bed

The heart of the technology is a pellet reactor, partially filled with a suitable seed material. This can be sand, garnet, crushed pellets or any other type of material.

The wastewater feed is pumped into the reactor in an upward direction, maintaining the pellet bed in a fluidised state. To crystallise the target component on the pellet bed, appropriate process conditions need to be selected. As a result of the ongoing cystallisation, pellets grow in size and gradually move towards the bottom of the fluidised bed. At regular intervals, the largest pellets are discharged from the reactor and replaced by fresh seed material. After atmospheric drying, ready-to-use and virtually water-free pellets are obtained.

Product Range

- Hardness, phosphates, fluoride and heavy metals removal
- Field Erected Units / Pre-assembled Units
- Modular system
- Flow rates: 0.1 - 5.000 m^3/h per module
- Circular or rectangular reactor footprint
- Tailor-made reactor materials selection: concrete and steel

Advantages of the Crystalactor®

No residual waste

A major advantage of the Crystalactor® is the production of highly pure and low waste pellets. The pellets are easy to handle and due to their purity can often be recycled or reused, resulting in zero-waste water treatment.

Four in one

By using the Crystalactor®, the four treatment steps in conventional chemical precipitation processes (coagulation, flocculation, sludge separation and dewatering) are combined into one. Because water-free pellets are produced, troublesome and costly sludge dewatering is eliminated.

Compact and cost effective

High surface loadings in the range of 40-120 $m^3/(m^3.h)$ are applied, resulting in compact Crystalactor® modules with a small foot print. The combination of relatively low capital investment and operational costs makes the Crystalactor® technology a cost effective solution.

Applications

Throughout the years, the wide number of Crystalactor® applications has continued to grow. Applications for drinking process and wastewater include:

- Softening
- Phosphate recovery
- (Heavy) metal recovery
- Fluoride recovery
- Pre-treatment for de-ionisation
- Pre-treatment for inland desalination
- Water recovery from membrane concentrates

In softening applications Calcium Carbonate pellets are recovered using lime, caustic or soda ash as reagent. An attractive feature is that softening can result in a significant reduction of Total Dissolved Solids levels. In addition, softening can also be used to recover water from membrane filtration concentrates.

Metals are generally recovered as hydroxide, carbonate or sulphide compounds, while anions are usually removed as calcium salts. In certain applications it is more desirable to form complex salts. For example, phosphate can be removed as $MgNH_4PO_4*6H_2O$ ('struvite'), which simultaneously reduces the wastewater nitrogen content and is a slow release fertiliser.