

Nordic Pharma

Nordic water has today two different well proven technologies for micropollutant reduction:

1. Based on adsorption or to some extent biological removal with Granular Activated Carbon (GAC)
2. Powdered Activated Carbon (PAC).

Each technology has its own benefits.

Powdered Activated Carbon can be dosed within or the existing activated sludge basins and retained within the sludge or preferred within a separate post-recirculating contact reactor. Some minor but significant amount of residual PAC are then retained efficiently with a special designed pile cloth with a fine opening suitable for PAC-removal, mounted on the DynaCloth filter.

Benefit with PAC, due to the small size grains or powder, the active area of the carbon exposed to water is extremely high. This will reduce the amount of carbon required and will often show low investment cost.

When using **Granular Activated Carbon (GAC)** as a post treatment stage, the original continuous sand filter DynaSand, with just a few minor modifications is used. The modifications are made to handle the lower density of the activated carbon and lower the wash water amount as well as the energy required.

Benefit with using GAC: Micropollutants adsorbed and the carbon itself is not mixed with the sludge and could be sent for incineration or reuse.

To get to the highest removal rates >85% of various pharmaceuticals residuals and antibiotic resistant bacteria's etc, a pre-treatment stage with Ozone is to be used before the DynaSand Carbon. The Ozone oxidise the pharmaceuticals and the carbon eliminate the sometimes harmful transformation products by adsorption or biological effects. To reduce the dosage of ozon and reduce the SS-load often a 10 micrometer DynaDisc microscreen is installed between the existing effluent and the Ozon contact tank prior to the GAC filters.

The continuous filtration used within DynaSand Carbon reduce footprint and makes it resistant to high loading of suspended solids. This achieved without any extra strain on the wash water treatment stage. No clean water or wash water storage tanks are required in DynaSand Carbon, and normally redundancy of filter system is not required. Most of the time DynaSand Carbon filters are operated with intermittent washings of the carbon, the so-called Wash Water Recovery (DynaSand WWR) to further save energy and wash water usage.

The design with DynaDisc + Ozon + DynaSand Carbon has also proven to reduce microlitter as: microplastics, fibers and non-synthetic fibres with additional 80% over this treatment stage.

