FACT SHEET

Tertiary Treatment Products

Arvia is a team of tertiary water treatment experts with over a decade of installation and integration experience.

Its innovative Nyex™ systems have been designed to tackle the most challenging waters which other technologies cannot properly clean. They are designed and manufactured in-house and can be combined, where necessary, with ancillary technologies to provide a fully operational solution which is tailored exactly to your treatment requirements.

We have two core technologies, the hero products of each are Nyex Rosalox™ and Nyex Ellenox™.

Nyex Rosalox™

The Nyex Rosalox™ treatment process combines adsorption with electrochemical oxidation in a single, scalable unit. As the water flows into the reactor tank, contaminants are concentrated onto the surface of the proprietary Nyex™ adsorbent media. A low electrical current is simultaneously passed through the media bed to fully mineralise the adsorbed contaminants to water and gases, which are vented away.

The patented media is non-porous with high electrical conductivity and allows for targeted and continuous oxidation of the contaminants. Unlike granular activated carbon (GAC), Nyex™ media is effectively regenerated in-situ and the process can continue without interruption.

Nyex Rosalox™ Key Benefits

- Removes hydrophobic recalcitrant organics to trace levels
- Removes persistent organic compounds such as active ingredients from pharmaceuticals and agrochemicals
- COD polishing from ~300mg to very low levels
- Low energy consumption due to localisation of contaminants on the adsorbent media
- No chemical dosing which allows for safe reclamation or discharge of wastewater

Nyex Ellenox™

The Nyex Ellenox™ treatment process is an established technology which produces powerful hydroxyl (OH-) radicals that electrochemically destroy organic contamination, such as COD, to application-specific acceptable levels.

Nyex Ellenox™ Key Benefits

- Removes recalcitrant COD from <10,000 mg/L COD to low levels for low flow rates
- Removes recalcitrant COD from <2,500 mg/L COD to low levels for medium flow rates
- Removes hydrophilic or hydrophobic contaminants from water
- High concentration of OH- radicals indiscriminately attack even hard-to-adsorb compounds
- Allows rapid removal of background COD, pre-treating wastewater for targeted removal of persistent compounds by Nyex Rosalox™

No chemicals and no sludge generated

In contrast to traditional advanced oxidation processes (AOPs), results using the Nyex Rosalox™ and Nyex Ellenox™ processes are achieved without chemical dosing and the production of toxic sludge or secondary waste, which are becoming increasingly expensive for industrial facilities to manage and dispose of.

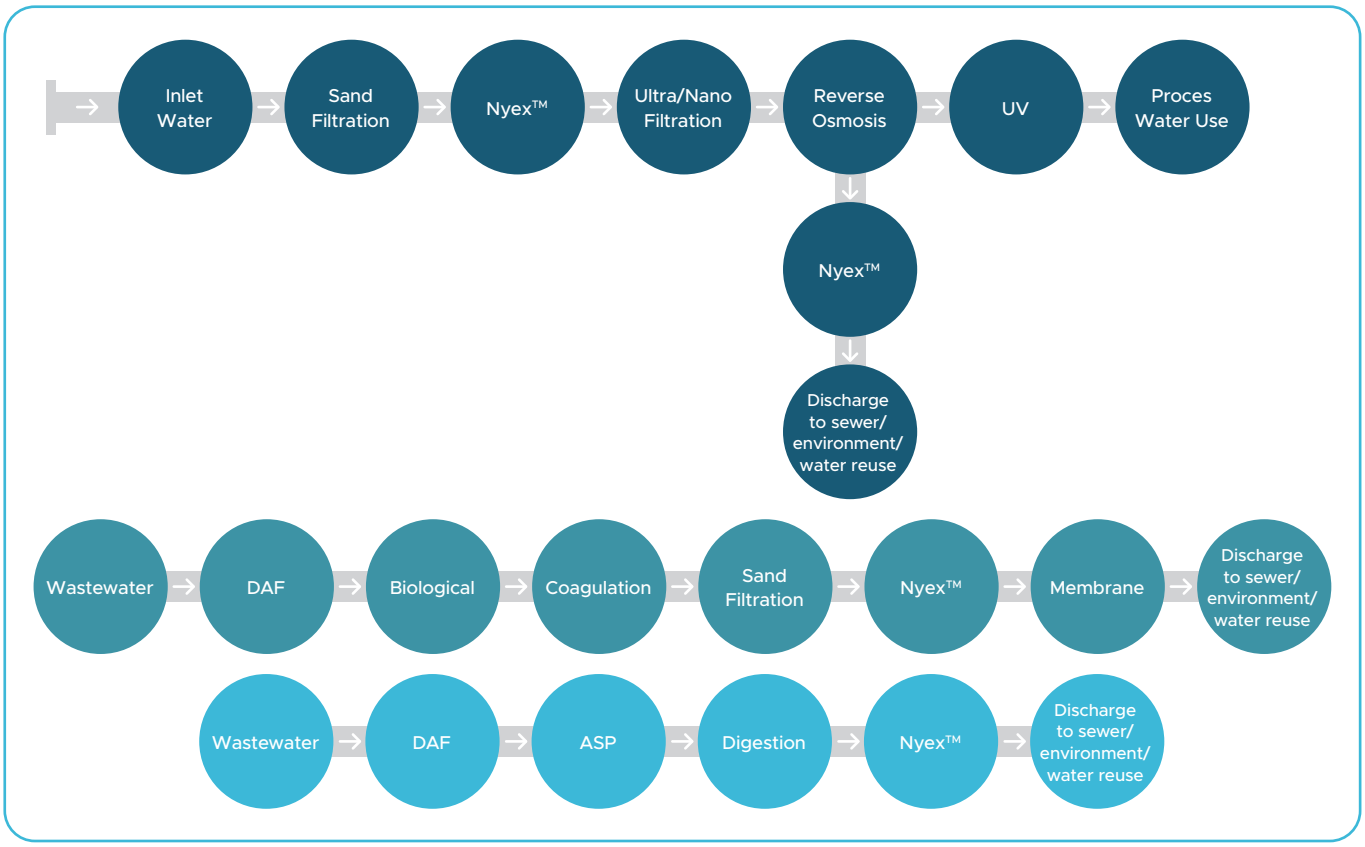
Increasing the efficiency of existing processes

Water is complex and often requires various treatment steps to ensure it is of a sufficient quality for its intended purpose.

Nyex™ can be placed at various points in the treatment train to increase the effectiveness of other processes. For example, we sometimes place our Nyex™ systems before RO systems to protect the expensive membranes from certain compounds.

We have also used our system to increase the life of a GAC process to save OpEx and reduce environmental cost of GAC renewal.

Examples of how we have integrated into a treatment train to meet specific needs and maximise results can be seen below:



Low Risk Water Treatment

Some of our clients require a low-risk solution so that is why when you work with Arvia you get the option for a three-step delivery:

1. Bench testing in our lab

Testing your water against each of our technologies under different conditions optimises the treatment performance and efficiency of subsequent pilot.

2. Pilot testing on your premises

Installing a pilot plant over a few months allows us to assess and develop the treatment process under real operating conditions, capturing variable conditions.

3. Data driven full scale design

This approach increases certainty over cost and performance early in the project, reducing risk.

Get in touch to discuss your company's treatment challenges and arrange a treatability trial on your wastewater today.

arvia

The Heath Business and Technical Park
Runcorn, Cheshire WA7 4EB
United Kingdom
Telephone: +44 1928 515 310

arviatechnology .com

Partner per l'Italia:
waterspin

Via Parini, 96 - 20064 Gorgonzola (MI)
Tel.+39 02.9511419 - Fax +39 02.9511568
info@waterspin.net - www.waterspin.net

FACT SHEET

Water is imperative to sustain life on earth. Global water demand will outstrip supply by 60% by 2030.

Many of the world's aquatic ecosystems are already severely damaged due to human interference, including industrial manufacturing. Most industries are now very aware of the issues of pollution and water reuse and take it very seriously. But it's an ongoing challenge.

Traditional water treatment processes were not designed to remove pollutants to low levels demanded by new regulations. This is forcing industries to look to new technology to solve these ongoing problems.

Implementing water reuse strategies and improving the quality of water resources is vital to avoid the predicted gap between supply and demand by 2030.

Organic Micropollutants

Overcoming the treatment challenge

Opportunities

Due to advances in analytical techniques, contaminants can now be identified, even at trace levels in water bodies. Arvia has developed a patented process to provide targeted removal of micropollutants from wastewater and drinking water supplies.

We have demonstrated removal results of up to 99% for micropollutants listed in the EU Water Framework Directive. This brings water in compliance within safe regulatory limits.

Future-Proof Treatment

Micropollutant treatment is required before wastewater is discharged or reused.

The nature of water is increasingly complex due to the presence of micropollutants from various sources. Arvia is working to tackle known and emerging contaminants and design tailored solutions for each treatment challenge.

Sources of micropollutant contamination include;

- Pharmaceutical manufacturing and use.
- Chemical manufacturing and use.
- Agrochemical manufacturing and use.
- Waste management including landfill leachate.
- Manufacture and disposal of personal care products.

Impact

Some consequences of inadequately treated water containing micropollutants include;

- Antimicrobial resistance such as antibiotics becoming ineffective.
- Inadvertent dosing of medication in water.
- Bioaccumulation of micropollutants in the food chain.
- Population decreases in aquatic species due to feminisation and submissive behaviour.
- Over-exposure of medication in intensive animal farming leading to allergic sensitivities in humans eg. Penicillin.

Regulation

As analytical techniques improve, the visibility of micropollutants in water bodies increases. This has lead to more stringent regulations being set and enforced by controlling bodies to minimise the levels of micropollutants entering the environment and drinking water.

Nyex™ Treatment Applications

We design and supply Nyex™ tertiary treatment systems which remove organic micropollutants and recalcitrant COD from industrial wastewater. Typical applications include:

- Removal of specific organic micropollutants or recalcitrant COD from a manufacturing effluent.
- Enabling industrial water reuse as part of a Zero Liquid Discharge strategy.
- Inlet water treatment, removing contaminants before they enter your production process.
- Protection of existing treatment processes.
- Increasing the efficiencies and lifespan of existing treatment processes.

Containerised Nyex™ Treatment System on site at Anglian Water

nyex rosalox

Our Nyex Rosalox™ treatment system combines adsorption with electrochemical oxidation in a single, scalable unit.

We have treated challenging wastewaters from many industries in Europe, Asia and US. Our technology is best suited to those applications with a particular micropollutant or active ingredient to remove. In order to reduce hazardous organics to trace levels the systems are optimised when the flow rate is fairly low.

Flexibility

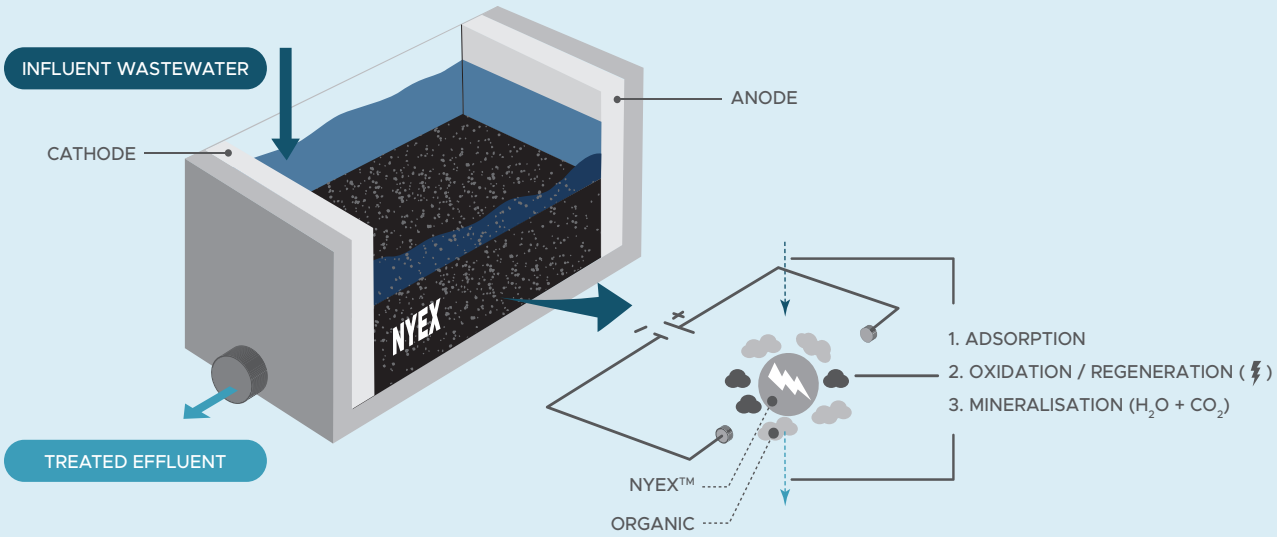
Highly successful as stand-alone solutions, Nyex™ systems are extremely adaptable and can also be utilised to complement other existing or planned treatment processes.

Costs

Operational costs for treatment are controllable and lower than other systems because of the concentration of pollutants onto the surface of our conductive Nyex™ media. Energy use is in proportion to micropollutant concentration. The systems are free from chemical dosing and do not produce sludge, so no need for specialist disposal off-site.

Nyex™ treatment systems are low maintenance and require minimal manpower and training to operate.

Nyex™ Treatment Process



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