



nijhuis
INDUSTRIES

SOLID SOLUTIONS IN A FLUID WORLD

nijhuis Vision & Mission



Solid solutions in a fluid world

Nijhuis Industries delivers 'solid solutions in a fluid world' as a response towards a greener economy. Nijhuis is aiming to turn cost centers into profit centers with solutions for sustainable water use and resource recovery.

To accommodate the customer requirements, Nijhuis offers customized installations to meet today's challenges, as well those of the future, across a wide range of industries and municipalities in today's 'fluid' world.

Sustainable Water Use & Resource Recovery

We provide a unique portfolio of smart and game-changing solutions in sustainable water use and resource recovery combined with our intelligent services to create profit out of (waste) water, process water and waste.



Reduce, Reuse and Recover

It is our ambition to help customers and deliver solutions to:

- Reduce the amount of (waste)water and effluent charges;
- Reuse treated effluent or process water;
- Recover water and resources from your waste and (waste)water.

We help our valued customers to meet their increasingly demanding sustainability requirements, lower their environmental footprint, combine productivity and energy efficiency and reduce life cycle cost at the same time.

nijhuis Customized Solutions



DBFMO Solutions

To completely match your requirements, Nijhuis has developed a contract staircase model to offer different contract forms to customers. The staircase consists of design (**D**) - build (**B**) - finance (**F**) - operate (**O**) and - maintain (**M**) services to completely match your requirements. In this respect we offer turn-key, lumps sum and open book contracts.

With each of these steps your total cost of ownership will be lowered by enhancing our involvement and offering operational excellence, expertise and specifications.

Turn-Key Solutions

The project execution of turn-key solutions is performed with a multi-disciplinary team based on our in-house added value services. By this means we can guarantee solution performances and operational consumables, minimizing customer surprises during installation operations. We have dedicated and specialized teams with extensive experience in designing, developing and implementing our mostly in-house developed solutions and services.



Rental and Modular Solutions

A large fleet of modular rental solutions are available for use anywhere around the world. Due to the smart and modular design, we strive to deliver rental solutions with the smallest possible footprint and maximize the flexibility to coop with demand requirements.

Our rental and modular solutions are applicable to a variety of applications and technologies to treat your municipal and industrial wastewater and process water in compact modular units.

The rental period is tailored to your needs and special arrangements can be made for longer rental periods including operation, maintenance and the supply of consumables and spare parts. The Nijhuis rental solutions are based on a 'plug and play' principle, helping to achieve the ever demanding sustainable requirements.

nijhuis Solutions & Services



Sustainable Water Use & Resource Recovery Solutions

More than ever water is a critical resource where increasingly demanding environmental requirements have given rise to new technologies and working practices to create a more sustainable way of treating and reuse wastewater. Nijhuis Industries has a broad experience and application know-how within a wide range of industries. We are designing the most appropriate solutions to reduce, reuse and recover (waste)water meeting or exceeding the industry standards.

Turning wastewater into profit underlines Nijhuis Industries' determination to fulfill the market's need for innovative, sustainable solutions with minimum life cycle cost. We believe in the value that wastewater and waste provides to the customer, all depending on materials used in the industry.

Application and technologies include:

- Discharge of (waste)water, reducing effluent charges.
- Recycling of polished water for irrigation purposes or cleaning in place (CIP).
- Ammonium recovery into ammonium sulphate, a valuable bio-based fertilizer.
- Oil and high quality fat separated and reused as animal feed or biofuel.
- Convert different types of organic waste into renewable energy and heat.



Intelligent Services

The (waste) water management and care for the environment is very important for the continuation of your business. Nijhuis Industries is your natural partner to reduce the life cycle cost of your waste, wastewater and disinfection plant to maximize the performance of your installation with the Nijhuis intelligent services (i-SERVICES).

Nijhuis has gathered extensive know-how to service and maintain your system based on more than 2400 references to discharge and reuse your water in compliance with the local environmental legislation and create value out of your (waste) water.

nijhuis Customer Benefits



Application know-how in (waste)water, process water and waste

We strongly believe that through combining our application and process know-how and longstanding expertise in a large number of industries, we can deliver solid solutions with the highest level of innovation.

Nijhuis was founded in 1904 and our flexibility and customer-oriented approach have been important values in our company history with more than 2400 references around the globe.

Glocal network and multi-disciplinary teams

Our customers benefit from our global network and local knowledge provided by our regional Sales & Service Centers, local representatives and business partners.

Our 'glocalized' solutions are developed by multi-disciplinary teams combining the experience of our global engineering and research activities and the knowledge and skills of our local service providers and business partners.

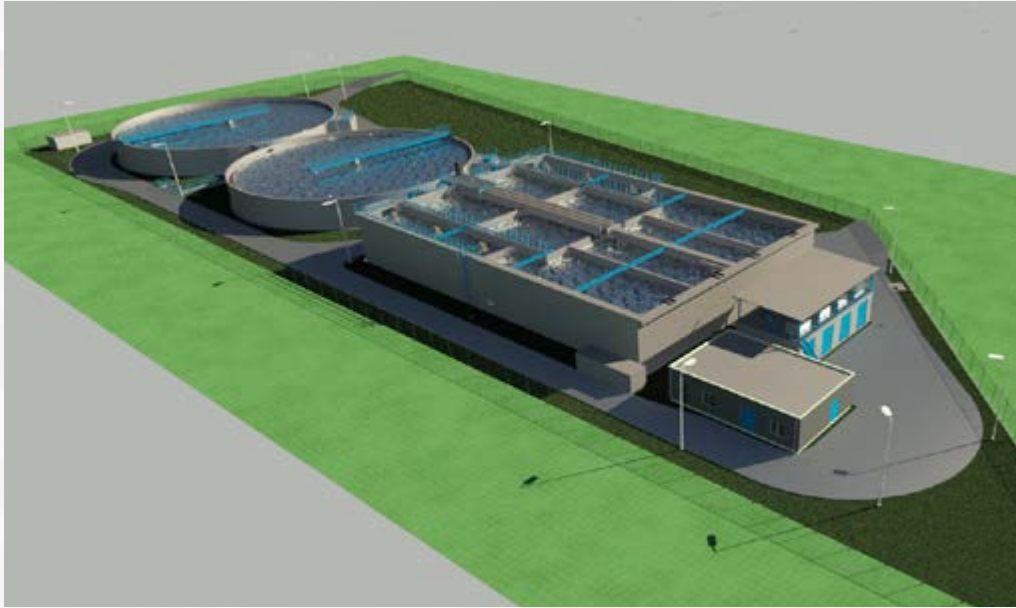


In-house (patented) solutions and services

We have dedicated and specialized teams with extensive experience in designing, developing and implementing our mostly in-house developed solutions and services.

For example, oil-water separators, dissolved air flotation (DAF) and dissolved gas flotation (DGF) units, biological treatment systems (like BIOCTOR and AECOMIX™), recycling, disinfection and sludge dewatering systems can be supplied as single units, integrated overall solutions or modular installations according to specific and local requirements.

nijhuis Added Value Services



Research & Development

Our experienced Research and Development technologists are continuously working on the development of smart of game-changing solutions. We perform a wide variety of tests executed in our laboratory often supported by pilot trials on-site.

Design & Consultancy

Our design and consultancy team has extensive experience undertaking all types of water, wastewater, planning support, flood risk, construction, and other environmental consultancy work.

Projects & Engineering

Our team of experienced project managers is responsible for meeting the objectives of the project in close relationship with our clients and the project team based on a fast-track approach.

Manufacturing

Nijhuis Industries provides the most sophisticated manufacturing workshop, securing our customers with the highest quality against a competitive price for standardized products and international standards like ATEX, Norsok or custom-made designs.



Inspection, Packing and Delivery on site

Before the equipment leaves the manufacturing facility, the equipment is thoroughly inspected by our quality controllers. During inspection and qualification of suppliers, equal quality assurance procedures are applied.

Installation & Commissioning

Installation and commissioning activities are executed according to the agreements in the contract. The civil construction works phase can start during different stages of the project depending on the ground conditions, equipment supply and planning.

Operation & Maintenance

Our team of experienced field engineers can operate and maintain your plant, securing operational excellence, preventive maintenance and the lowest possible operational cost.



More than 2400 Industrial & Municipal References

We have gained unparalleled knowledge in a wide range of industries, meeting or exceeding the industry standards. Every industry has its own specific (waste)water process and characteristics.

- **Algae.**
- **Biodiesel.**
- **Cement & brick.**
- **Hospitals and medical residues.**
- **Holiday parks & swimming pools.**
- **Pharmaceutical.**
- **Plastics recycling and metal industry.**
- **Power plants.**
- **Pulp & paper.**
- **Textile and tanneries.**



Food & Beverage

Nijhuis Industries has a long-standing experience and application know-how in the food and beverage market. Our reference base includes clients from multinational to local companies across the following industries:

- Breweries, distilleries and wineries.
- Soft drink and beverage producers.
- Convenience, ready meal and food processing.
- Potato and crisps processing.
- Dairy processing.
- Edible oil processing.

Cooling Water Disinfection

Cooling tower systems and heat exchangers reuse process water for heat exchanging and are susceptible to pollution and bacterial growth due to the circulation of warm water streams which are exposed to air for cooling.

Ozone technology offers the most efficient, safe and sustainable (no use of chemicals) way to remove pollution and bacteria such as legionella.



Municipal & Sewage

Our unique portfolio for the municipal & sewage market consist of the supply of (waste)water consultancy and equipment delivery, through to providing a complete integrated solution encompassing design, civil & MEICA installation/commissioning. The Nijhuis sedimentation systems have proven to be very successful in the market, supplied in either concrete, stainless steel or (super) duplex performing in the most harsh conditions.

The units can be used as pre-treatment, separation and concentration of biological excess sludge and polishing effluent after biological treatment to remove phosphorous and suspended solids with the smallest possible footprint and lowest possible energy consumption.

Protein Processing & Biofarming

Nijhuis has years of experience in designing complete wastewater treatment plants and recovery of energy plants in the meat processing market, turning waste and wastewater into value across the following industries:

- Fish, meat and poultry processing.
- Agricultural waste, manure and digestate and biogas processing.



Oil, Gas & Mining

Nijhuis Industries offers solutions for the removal of hydrocarbons and other contaminations from water:

- Produced water, slop water and mining.
- Injection water.
- Drilling mud.
- Cleaning water from storage tanks.
- SAGD water and storm & rain water.
- Refinery and petro-chemical wastewater.
- Chemical and fertilizer production.

nijhuis GLocal Network



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SOLID SOLUTIONS IN A FLUID WORLD

Resource Recovery



Biogas / Waste to energy

Under anaerobic circumstances organic waste material is transformed into biogas which can be used to produce heat and electricity.

Raw material preparations & storage: Storage and preparation of the raw materials is required to maintain a frequent and high quality feed to the digester.

AECOMIX™-TAURUS: A digester solution where under anaerobic conditions the feed materials are digested / fermented to create biogas with around 50-60% methane and 30-40% carbon dioxide. The digester tank is equipped with a mixing and heating system.

i-WONDER: A biogas booster solution and/or increased dewaterability of sludge with the innovative i-WONDER plug and play solution.

Biogas treatment & utilization: Biogas can be used to feed boilers and Combined Heat & Power (CHP) installations or can be upgraded to green or natural gas and supplied to the (natural) gas grid.



Resource Recovery

Digestate is a solid material that remains after anaerobic digestion, to be turned into fertilizer.

Solid / liquid separation: The solid fraction from the digestate can be separated from the liquid fraction by mechanical separation systems, like screw press, decanter centrifuge or dewatering drum.

NAR: Ammonia recovery solution from digestate into a bio-based fertilizer, turning waste into value. The NAR has a proven ammonia removal efficiency of 80-90%. Dilution of the substrate creates a higher biogas production by minimizing toxicity.

GENIAAL: A revolutionary and cost-effective manure treatment solution to turn manure into a bio-based fertilizer and clean water.

Pre-treatment



Filters

Filter systems are used as primary screening to separate large particles from your wastewater. Removal of these particles prevents downstream pipe blockages and protects upstream equipment.

NPS: Self-cleaning channel filter Aquarake.

NZB: Straightforward curved screen.

NTF: Inside fed rotary drum screen.

NRF: Externally fed rotary drum screen.

NDF: Inside fed cloth drum filter.



Gravity Separators

Designed to remove heavy settling and floating particles from water without the addition of chemicals and energy. Also used to recover valuable materials from water, without any contamination of additives, for sale or reuse.

NTB: Robust and straightforward sedimentation unit / lamella settler to remove 'heavy' particles from wastewater.

NSS: A sand separator for specific wastewater streams where sand and sediment from settlers and flotation units can be automatically removed and concentrated.

CPI: Oil water separator in a concrete basin which operates by using gravity to separate oils from oil contaminated streams.

CCS: Oil water separator in a stainless steel unit which operates by using gravity to separate oil from oil contaminated streams.

PPA module: Standardized plate pack module which can be integrated in CPI designs.

Pre-treatment



Flotation

The Dissolved Air Flotation system is based on the Nijhuis proprietary and intelligent aeration system (i-AIRATION) which forms fine air bubbles that support and increase the separation of particles. The DAF units can be supplied with several add-ons, making the unit the most intelligent DAF on the planet.

IPF & NPF: Compact flotation unit with plate packs, for low or high capacities.

GDF: Open flotation unit designed for handling high sludge loadings

High Rate DAF: DAF applications for high capacities above 800 m³/hr / 20 MLD for large scale water production facilities, as a pre-treatment step for surface and seawater.

DGF: Dissolved Gas flotation using for example nitrogen-gas or biogas in the aeration system, thus preventing excessive oxygen-levels in the treated water.

ICF(F): A revolutionary next generation system DAF based on a plug and play principle, available in boxframe or container set-up.



Coagulation & Flocculation

These systems remove emulsions, dispersions and heavy metals from the wastewater by adding coagulant, flocculant or precipitant.

PFR: Pipe flocculator, designed for effective mixing of chemicals with wastewater

i-DOSE: Intelligent dosing to reduce chemical consumption costs up to 30% based on real-time monitoring.

CDU: Skid mounted chemical dosing units with all required safety measures. For flocculant dosing units we make use of the FDU range.

NMA / NMM: In-house range of flocculant make up units for an optimal dosing concentration.

i-FLOC: A range of intelligent flocculants which is economical to use and effective over a wide range of pH.

(An)aerobic Biological Treatment



Anaerobic AECOMIX™ solutions

AECOMIX™-TAURUS: The reactor is suitable for all types of waste and renewable energy crop based on a mixed and heated digester tank.

AECOMIX™-DGF: The award winning AECOMIX™-DGF is a revolutionary and highly innovative solution, especially tailored for food and beverage plants treating wastewaters with high TSS and/or FOG. The concept provides a single step process solution.

AECOMIX™-EGSB/UASB: High-rate anaerobic technology offers high COD and BOD wastewater removals in a highly loaded anaerobic system with minimized footprint.



Aerobic BIOCTOR solutions

BIOCTOR-SBR: An easy and flexible to operate single tank solution.

BIOCTOR-CONTINUOUS: Water flows by gravity through the required steps of treatment of a continuous system with a clarifier or DAF for sludge and water separation.

BIOCTOR-MBR: A sludge water separation system by membranes, using flat plate or hollow fibre membrane modules to be installed either in the aeration tank or in a separate membrane tank.

BIOCTOR-MBBR: The addition of carriers results in a more effective growth of bacteria, whereby a compacter aeration can be used. A DAF system can be included to remove solids in case of a strict effluent limit.

FLEX AERATION: The Nijhuis FLEX-AERATION system is a flexible fine bubble aeration solution for SBR, CONTINUOUS or MBR applications, resulting in custom-made configurations and a plug and play principle.

Polishing, Reuse & Disinfection



For **polishing** your industrial wastewater to very stringent discharge consents or to optimise your process water system we have developed a range of polishing systems:

CSF: A continuous sand or cloth media filter to remove particles from the wastewater by filtration over a sand bed, where the removable particles stay behind in the sand and the cleaned water can be discharged continuously.

CP: The Nijhuis CarboPure combines conventional activated carbon filtration with our advanced air dissolving technology. While organic substances are absorbed by the activated carbon, the dissolved oxygen is used by the bacteria in the filter to break down the organic material.

MF / UF / NF and RO: Membrane separation processes are based on a straight forward separation method, the membrane acts as a very specific filter, impurities will be retained and water will pass the membrane. Selection criteria depend on the impurities that need to be removed.



NUV: For clear water streams disinfection of water can be achieved by UV-C radiation, a specific light wavelength that damages the DNA structure of micro-organisms.

NOS Q and NOS XL: The NOS Q and XL series ozone generators are the most accurate, safe, sustainable and energy-efficient in the world. In order to remove the undesired side effects of using chemicals and disinfectants, ozone technology provides a chemical-free solution.

ATC: The automatic tube cleaning system provides a permanent solution to combat scaling and fouling problems for heat exchangers by reducing power consumption, minimizing shut downs and maintenance costs.

Sludge Management



Sludge disposal costs are a key component in the operational costs of wastewater and waste treatment systems. Dewatering the produced sludge can reduce the disposal costs dramatically, as the dewatered sludge can be integrated in a biogas installation to produce more biogas.

The sludge management solutions can either be integrated in the total process or offered as a single solution to maximize the value of your sludge.

NDF: The cloth drum filter is an inside fed screen with a perforated drum covered by a cloth, specially designed for dewatering excess sludge up to 6% dry solids or as solid and liquid separation for manure.

NCFP: Filter presses dewater sludge in chambers by applying very high pressures to the system.

NSP: A sludge screw press is a flexible sludge solution, separating sludge into a liquid and a solid fraction.



i-FAT: Maximize the value of flotation sludge, turning flotation sludge into biofuel based on the water, solids and fat concentration in the sludge. It is a true ROI based system as the biofuel can be used as energy production on site and flotation sludge disposal cost are substantially lower.

Decanter centrifuge: A decanter centrifuge separates solids from one, two or three liquid phases in one single continuous process and can be used as a separation technique to separate solids from the digester into a liquid fraction and a solid fraction.

Beltpress: Dewatering of sludge by a belt system, first stage by gravity, followed by a pressurized belt for further dewatering.

Chemical Free Water Treatment



We are an expert in **chemical free water treatment**, providing water treatment solutions to eliminate bacteria, biofilm, viruses, hormones, pesticides and pharmaceuticals and recalcitrant COD. We have more than 25 years of experience in disinfection and water reuse, applied in several industries.

Ozone Technology

Ozone gas (O_3) is a powerful oxidizer and disinfectant. Its oxidation potential is 150% higher compared to chlorine products. Ozone is a natural gas that oxidizes approximately 600 to 3000 times faster than any other chemical product.

Ozone does not only eliminate bacteria, but also viruses and other microbiological organisms, leaving nothing but oxygen (O_2), and water after the disinfection process. Ozone has the additional advantage that hazardous biocides or chemicals are no longer required in the process.



Ozone applications:

- Chemical free disinfection of pasteurization of sterilization lines to guarantee food safety.
- Chemical free disinfection of cooling water, eliminating bacteria like E.coli, Salmonella, yeasts, fungi and legionella.
- Reuse of process water for CIP purposes.
- Elimination and prevention of biofilm in cooling towers.
- Decompose toxic components like pharmaceuticals, pesticides and hormones in water.
- Decoloring of water.
- Odour control.

Intelligent Services



i-CONSULT, upgrade & extension

With the Nijhuis i-CONSULT, options can be identified to improve efficiency, reduce cost and create value and engage opportunities with your senior management, staff and your supply chain in driving through improvements. This can then lead to the seamless design, supply and installation of any identified solutions together with the upgrade or extension of the plant.

i-MAINTENANCE

Nijhuis offers you intelligent preventive and corrective maintenance programs. Our after sales support team support you offline and online to optimize your installation. We will check the equipment of your installation and give you advice to keep your equipment at maximum performance.

i-MONITORING

The Nijhuis i-MONITORING program is a true intelligent service with a ROI based on the current or expected OPEX of the system. We provide a complete management of your installation through 24/7 monitoring, which is facilitated from our monitoring center in Doetinchem, the Netherlands. The Nijhuis in-house developed VPN routing NI-connect and monitoring services support operators to continuously improve the reliability of the installation and keeping the life-cycle cost to a minimum.



i-ACADEMY

The Nijhuis i-ACADEMY training provides a global network opportunity to exchange best practices from around the world and share valuable process information. Training can be provided at our headquarters or at any location in the world and is always tailored to the requirements of the audience.

i-CONTROL

The Nijhuis i-CONTROL will dramatically reduce installation cost as well as the amount of cables, minimizing and shortening the installation time. The i-CONTROL is an intelligent cost-effective electrical control and installation method for wastewater treatment plants.