ADGEX
Advanced Green Expertise

reVODA

FOR INDUSTRIAL PLANTS
FOR DOMESTIC WASTEWATER
FOR COMPANIES IN THE AGRIBUSINESS SECTOR
FOR SEWAGE SLUDGE MAPS OF WATER UTILITIES

Physico-chemical wastewater treatment technology based on reVODA reactors

SYDNEY

CORE COMPETENCIES

ADGEX designs, manufactures and installs complete turnkey wastewater treatment systems:

- domestic wastewater from settlements and industrial enterprises;
- wastewater from agro-industrial enterprises, ilivestock, poultry and fish farms, dairies, imeat processing plants, slaughterhouses, etc.
- industrial effluents with COD above 2000 mg/l; electroplating plants; chemical plants; resource extraction facilities, etc.
- wastewater from landfills;
- silt maps of water utilities.

The integrated systems we implement provide treatment and neutralisation of toxic wastewater that conventional biological treatment technologies cannot cope with.

The comprehensive wastewater treatment lines using reVODA reactors ensure the highest water quality, from process water to drinking water and special purpose water.

TECHNOLOGICAL UNIQUENESS

Our proposed technical solution is based on the use of the unique reVODA reactor.

reVODA is a closed electromagnetic field reactor based on the principle of magnetic cavitation treatment of wastewater. Inside the reVODA reactor, there are needle elements that act as cavitators. Due to the collapse of air bubbles at the gas-liquid interface of the treated effluent, a shock wave (cavitation effect) is generated, which contributes to the mechanical destruction of organics and mechanical destruction of pathogenic microflora in the treated effluent. The reVODA reactor is unparalleled in the world. It is mobile, which means that it can be placed together with its auxiliary equipment practically anywhere, both in the territory of existing plants and in the newly created infrastructure.

THE BENEFITS OF PURIFICATION LINES WITH THE USE OF reVODA:

- odours and pathogenic microflora are completely eliminated;
- heavy metals are neutralised;
- chlorine compounds, acids, salts and petroleum products are removed;
- treatment lines are not demanding in terms of effluent composition and temperature fluctuation;
- treatment lines are not sensitive to salvo discharges and downtime;
- have a high output in a small size;
- has low operating costs.

EXPERIENCE AND IMPLEMENTATION

Since 2011, based on reVODA reactors, our team has successfully completed and implemented more than 50 projects in various sectors of the economy and the national economy in different countries.

Our customers include: livestock units, poultry farms, biological waste treatment facilities, feed mills, drinking water preparation and bottling plants, in fodder mills and chemical production plants as well as in water treatment plants in cities and municipalities.

EXCERPT FROM THE REFERENCE SHEET OF PROJECTS BASED ON reVODA

DESIGNATION	CAPACITY
Poultry slaughterhouse treatment plant	360 m^3/day
Livestock unit treatment plant	864 m^3/day
Livestock unit treatment plant	600 m^3/day
Soybean oil facility waste treatment plant	288 m^3/day
Equipment for a water treatment unit for livestock complex	240 m^3/day
Waste treatment plant for a livestock facility	720 m^3/day
Water treatment equipment for drinking water bottling lines	120 m^3/day
Neutralisation line for sludge from wastewater treatment plants in cities with population exceeding 500,000	1080 m^3/day 288 m^3/day
Neutralisation line for waste water of hazard classes 1 and 2	280 m^3/day
Poultry facility wastewater treatment plant	360 m^3/day
Waste water treatment plant for paper recycling	

COMPARATIVE CHARACTERISTICS OF TECHNOLOGIES

CONVENTIONAL BIOLOGICAL TREATMENT	TECHNOLOGY BASED ON reVODA REACTORS
The need to maintain a constant bacterial biomass in order to ensure complete cleaning	Bacterial biomass is not used
The need for strict adherence to technological regime to ensure cleaning	Easy operation of the equipment (1 person), continuous operation possibility 24/7/365
If toxic compounds are present in the effluent, the biomass dies	Odours, pathogenic microflora and toxic compounds are eliminated
An inability to react flexibly: • to changes in effluent discharge patterns • to changes in the chemical composition of effluents • to natural temperature fluctuations • for short/long stoppages of production	Flexible operation of equipment (round-the-clock / cyclic), possibility of parallel and serial connection of reactors. A range of different neutralisation volumes (neutralisation of effluent streams with varying flow rates)
Significant financial costs of construction of treatment plants	Lower construction and installation costs and considerably less space equipment footprint
Higher energy consumption — 4 kW/m^3	Lower energy consumption — 0.5-0.8 kWh/m^3
Sanitary area — 150 metres	Sanitary area — 25 m
Lagoons and filtration fields need to be built	No necessity

PROCESSES IN THE OPERATING AREA OF THE reVODA REACTOR

In the working area of the reactor with ferromagnetic particles create a powerful electromagnetic field, which affects the effluent to be treated.

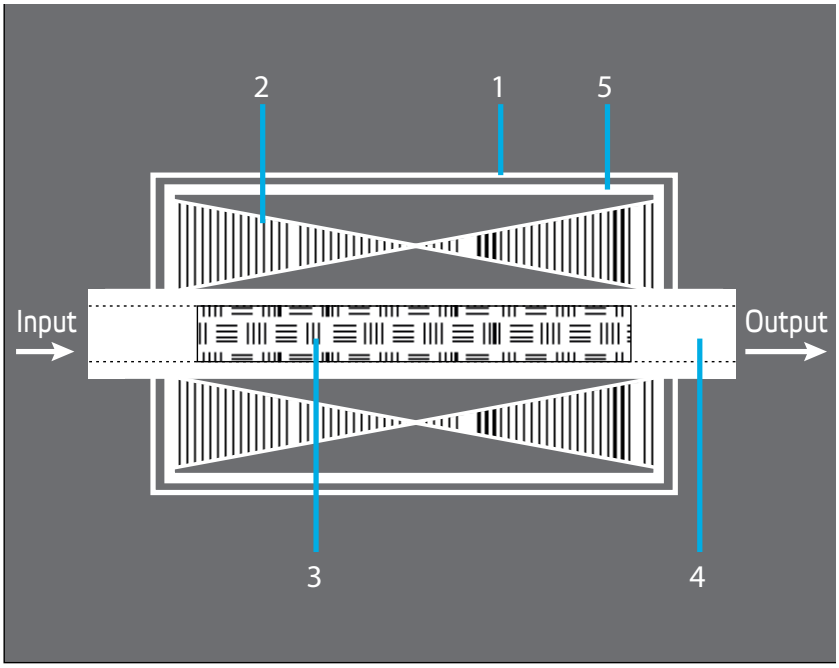
Due to the collapse of air bubbles at the gas-liquid interface of the effluent to be treated, a shock wave is generated, which affects the molecular structure of the treated substances

There is a mechanical breakdown of organics and the destruction of pathogenic microflora in the treated effluent.

The impact on the effluent to be treated is carried out by the following processes:

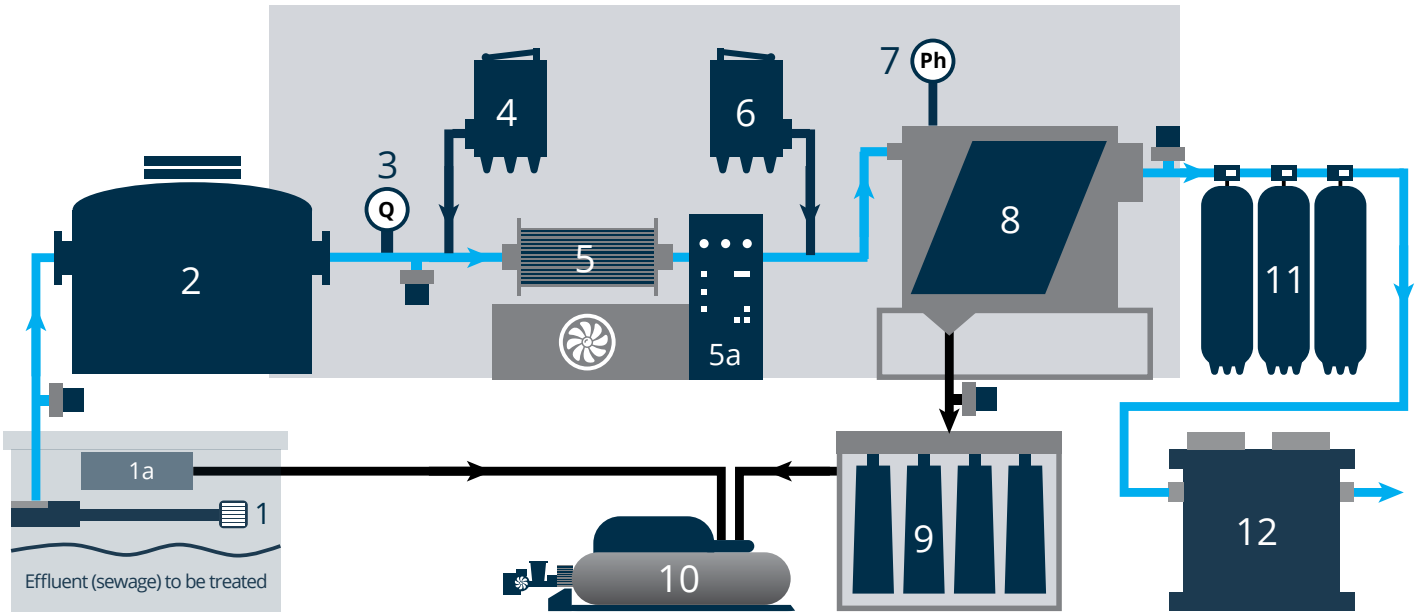
- shredding
- oxidation
- ion exchange
- cavitation
- magnetostriction
- mechanostriction

SCHEMATIC ILLUSTRATION OF REACTOR reVODA



1 Hull
2 Inducer
3 Needles
4 Replacement insert
5 Reactor operating area

INTEGRATED PURIFICATION LINE SCHEME



The wastewater from the receiving well is fed to the **Self-cleaning Trommel Screen (1)**, where coarse impurities are separated and sent directly to the **GreenBLAZE Unit (10)** for disposal.

The wastewater flows to the **Averaging Tank (2)**, from where it is pumped to the **ReVODA Reactor (5)**.

A reagent is dosed into the flow, which is prepared at **Reagent Dosing Station (4)**.

In reVODA reactor under the influence of electromagnetic fields the oxidation of medium and decomposition of oil products, neutralization of fats, paraffins, phenols, reduction of metal content, COD and BOD.

After treatment in the reVODA reactor, a solution of **coagulant/flocculant (6)** is pumped into the treated medium, if necessary, using a dosing pump.

The effluent then enters the **Sedimentation Unit (8)** where the treated effluent is separated into solid and liquid fractions.

The solid fraction goes to the **Sludge Dewatering Unit (9)** and then to the **GreenBLAZE Unit (10)**.

The supernatant water is fed to the **Sorption Treatment Unit (11)** and then, if necessary, to the **Finishing Treatment Unit (12)**.

VERSATILITY OF PERFOMANCE AND APPLICATION

OPTIONS FOR THE APPLICATION OF reVODA CLEANING LINES AND EQUIPMENT PLACEMENT

- Easily integrates with existing treatment systems when refurbishing and upgrading existing treatment plants to achieve higher treatment rates.
- Installed as a new wastewater treatment plant during the construction of new infrastructure facilities. There is no need for capital buildings, time-consuming underground and concrete works.
- The possibility of rapidly increasing the capacity by scaling up equipment.

OPTIONS FOR CONSTRUCTIVE EXECUTION OF reVODA CLEANING LINES:

- **Stationary —** installation of equipment in existing buildings and structures, rapidly erecting structures, capital construction
- **Mobile —** installation of equipment in a special container designed for transportation

TREATMENT AND NEUTRALISATION OF COMPLEX INDUSTRIAL EFFLUENTS

Complex industrial effluents are characterised by heavy metals, high COD (over 2000 mg/l), toxicity, and chemical compounds that are difficult to degrade. These effluents are highly hazardous. Existing treatment methods are ineffective due to the fact that production plants are progressing year by year and are becoming technologically more complex, and the treatment plants have generally been designed more than 20 years ago.

The reVODA technology effectively handles the particularly toxic effluents listed below, converts heavy metals into insoluble compounds, breaks down complex organic bonds, and lowers the COD level by removing organics into the sludge.

- Galvanic production
- Chemical production
- Medical production
- Pharmaceutical production
- Knitwear and textile factories
- Wastepaper recycling facilities
- Resource extraction industries

NEUTRALISATION OF ORGANOPHOSPHORUS COMPOUNDS FROM PESTICIDES AND HERBICIDES

Residues of unused herbicides and pesticides, including abandoned and expired ones, are chemically active poisons.

The reVODA reactor completely decontaminates and neutralises poisonous substances in herbicides and pesticides by decomposing the poisons into neutral substances and elements, which are then bound into safe compounds, removed and disposed of.

INDIVIDUAL CUSTOMER APPROACH & TURNKEY SOLUTION

A UNIFIED APPROACH TO EACH PROJECT

ADGEX carries out turnkey wastewater treatment and neutralisation, water supply, wastewater disposal and environmental projects from local tasks to large infrastructure projects according to the individual requirements of the client.

PROJECT WORKS

- Collection of material and on-site examination;
- Choosing the best solution;
- The selected solution is tested on the laboratory's own working test bench.

TECHNICAL IMPLEMENTATION

- Equipment manufacture;
- Functionality check;
- Quality control;
- Supervised installation of equipment.

TURNKEY LET

- Pre-commissioning works;
- Customer service;
- A personalised approach;
- Operational support.

GUARANTEED RESULT

- The technical solutions are based on 2 in-house technologies, reVODA and greenBLAZE, which are unparalleled in the world.
- The selection and configuration of the equipment is done individually for each task on the job.
- The chosen wastewater treatment method is guaranteed to be verified by means of a laboratory simulation.
- Optimisation of capital costs with maximum quality and a significant reduction in operating costs.
- Minimum number of employees to operate the cleaning line when it is in operation.

EXAMPLE of reVODA TECHNOLOGY IN PRACTICE

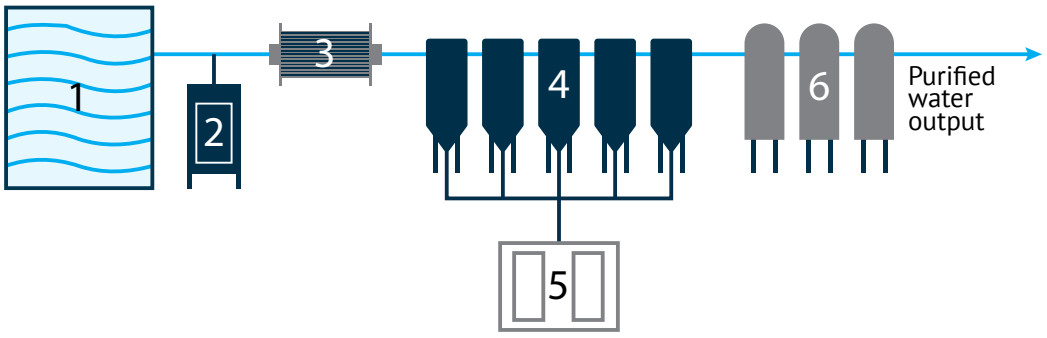
Customer — Experimental Mechanical Plant.
Type of activity — Production of molded waste paper products (paper pulp).

TECHNICAL TASK

- Installation of a recycled water treatment line: bringing pollutant levels up to regulatory standards
- Input data on the effluent:
  - Quantity of polluted water for treatment: 1,058,128 l/day (44.1 m3/hour, but not less than 15 m^3/hour)
  - Weighted solids: 500-700 mg/l
  - Total microbial count (TMC): 7,500
  - pH: 7,1
- The technological solution and equipment must comply with EU standards
- The equipment and materials to be used must be agreed with the client

TECHNICAL SOLUTION

Accepted and approved flowchart of the process line:



1 Collection tank
2 Reagent
3 Reactor reVODA
4 Sedimentators
5 Sludge filter bag
6 Finishing filters

OBTAINED RESULT

FLOW CHARACTERISTICS	EFFLUENT BEFORE TREATMENT	EFFLUENT AFTER TREATMENT
Weighted substances	500-700 mg/l	no more than 50 mg/l
Total microbial count (TMC)	7500	no more than 5
Ph	7,1	8,0

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