Innovative, sustainable solutions
NanoTech Overview

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Sewage Treatment

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Measuring & Control
Nanotech Water Solutions (Nanotech) is founded on a bedrock commitment to provide our clients with processed water that is:

- Pure
- Safe
- Reliable
- Consistent
- Quality that not only meets, but exceeds the legal requirements

Nanotech harnesses cutting edge technology to create sustainable solutions for our customers. We gladly accept the responsibility of being held accountable as custodians of these solutions way beyond commissioning.

Water is our business - and we’ve made it our business to stay on the leading edge of international water purification technology and trends.
Vision
Nanotech strives to be the entrusted custodians to apply innovative technologies in the treatment of challenging water resources.

Mission
Nanotech aims to achieve preferred supplier status from our customers at the lowest process risk. This will be accomplished by understanding the process and providing continuous support through the lifecycle phases of the various applications.

Accelerated payback and Return On Investment (ROI) will be achieved by exploring and expanding concealed benefits of the customer’s process and applying the most suitable technology. Nanotech commits to the vision by developing and empowering suitably trained employees who are skilled to meet their financial targets and aggressive growth objectives.

World Class Solutions
The name Nanotech Water Solutions (Nanotech) is synonymous with quality process products and services and world-class purification systems. Years of experience and product innovation allow us to offer a fully comprehensive range of capabilities and expertise.

Latest purification technology is the departure point from which we design innovative 21st century solutions to modern challenges, to achieve cost effective models and to address environmental concerns in line with national regulations.

In the industrial, pharmaceutical, mining, health care, paper, and food and beverage industry, water conservation and environmental awareness are becoming critical operational factors. At the same time, demand for product quality, product safety and economy has never been more intense.

A company who has the expertise to provide clients solutions, encompassing several technologies rather than supplying one product, which does not cater for specific needs.

Design Philosophy
Nanotech approaches each customer project as a unique challenge. We begin by gathering comprehensive information on the existing water conditions and the factors influencing the desired outcome.
FACTORS INFLUENCING THE OUTCOME:

- Current water contaminants and processes
- The customer’s specific requirements
- Regulatory requirements
- Geographical conditions
- Market and process demands
- Latest technologies, research and technical papers

Nanotech will meet the customer’s requirements in a cost effective, safe and efficient manner. Regulatory demands are non-negotiable.

Continuous monitoring and understanding of client obligations are of particular concern in all applications. At the same time, Nanotech is focused on creating the most cost effective water purification solutions, without compromising quality.

Turnkey Project Management

The degree of purification required determines the level of technologies appropriate for a particular application. Nanotech is able to deliver turnkey solutions that meet customer requirements and specifications.

We consider every manufacturing process a unique entity with specific needs and Nanotech custom design systems to suit each unique application.

Product and Systems Validation

In the Food & Beverage, Pharmaceutical and Cosmetics industries, it is often required by in-house quality regulations to validate all water treatment systems to ensure that the installed systems perform reliably and are capable of reproducing the required standards on a continual basis.

Our Validation Service uses the Parametric Approach that structures testing in a rational and scientific way. In all cases, data provided is supported by full documentation to meet the most stringent current and anticipated regulatory requirements.
Design Qualification (DQ), Installation Qualification (IQ), Operational Qualification (OQ) and Performance Qualification (PQ).

This total approach to validation gives customers peace of mind, knowing that every facet of their operation from “process to filter systems and equipment” conforms to the most superior international quality standards.

The company’s expertise and quality workmanship led to their achieving preferred-supplier status with the majority of their customer base, which has been recognised after achieving an ISO 9001:2008 certification.

Guarantees

All work is guaranteed, based on suitability and performance. On completion of a project, Nanotech offers a custom-designed preventative maintenance package to keep the plant in running order and to prevent any unnecessary, preventable breakdowns.

By focusing on what we do best, our customers are free to focus on their own core businesses. Our services therefore include frequent visits, detailed agreed-on performance checks and inspection on all installed equipment.
Innovation Successes

Our Research and Development teams strive to add value to the clients through the advancement made in the equipment and processes, allowing us to continue providing world-class technologies and solutions.

We identified that water disinfection and the chemicals currently being supplied for treating the water needed an upgrade. We are now able to produce two complementary chemicals Chlorine Dioxide and Bromine - Chlorine Dioxide is the best broad based disinfection chemical, with a wide range of benefits to the environment, communities and organisation.

We aimed to improve the current production methods not only for Chlorine Dioxide but also that of Bromine and now Nanotech is able to offer one means of producing these two complementary chemicals (Bromine and Chlorine Dioxide).

Water has truly become a scarce commodity, one which needs to be preserved. That is why Nanotech has taken up the responsibility to find means of improving technologies, which are more effective in treating/recovering/reusing/recycling/disinfecting water with the aim to preserve this scarce commodity.

For 3 years in a row: Nanotech received a bronze award in the Big Business category at the Rocci 2013 Business of the year event, a Silver award in the Rocci 2014 Business of the Year event, finalist in the 2015 Sacci Entrepreneur Award and taking home the ROCCI 2015 Gold award in the Large Business category.
Chlorine Dioxide

Chlorine dioxide is a broad-spectrum biocide that is effective against all bacteria, viruses, mold, fungi, algae and spore formers such as Giardia & Cryptosporidium.

CHLORINE DIOXIDE HAS BEEN SUCCESSFULLY PROVEN FOR:

- Disinfection at municipalities and boreholes for drinking water
- Color, odor and taste removal
- UF and RO feed, iron and manganese oxidation
- Improved clarification to reduce turbidity
- Up to 60% reduction of TOC in clarification process

Chlorine dioxide acts by first destroying the cell membrane, then the nucleus of the bacteria by chemical oxidation; not chlorination. Because the organism is totally destroyed no resistant strains can develop which enables chlorine dioxide to be used on a continuous basis without the need for alternating biocides.
Nanotech has been involved in chlorine dioxide generation for years, building systems locally, and testing all the chemical reaction technologies.

Each one of these technologies has its own unique advantages and disadvantages.

So it only made sense to learn from all the good systems and develop a superior system, fit for the African market!

Nanotech re-engineered chlorine dioxide generation methods to adapt to changing customer requirements and sensitivity to dangerous byproducts and contaminants added to their processes.

Nanotech designed chlorine dioxide generators to produce PURE CLO2 gas dissolved in water with efficiencies equal to that of stoichiometric chemistry (compared to some techniques with 58% conversion efficiency).

Some of the Nanotech Chlorine Dioxide Generator Advantages:

- Chemical conversion efficiency of 98.5%
- Less components which can fail
- Zero sodium ion in product
- Dangerous byproducts eliminated, below detection level
- Only one precursor and one regeneration chemical
- Corrosiveness significantly reduced
- Chlorine Dioxide gas dissolved in water to safe levels of 1600 ppm
- Very safe process and very low inventory of CLO2 solution in reactor
- No free Chlorine in product - HUGE ADVANTAGE for membranes and resin applications
- Transportation of chemicals significantly reduced (huge hidden cost if not made aware and using dilute concentrations)
- Chlorate levels minimized, almost eliminated due to pH during manufacturing process

NOW PRODUCING BROMINE SOLUTIONS
Sewage Treatment

Nanotech’s sewage treatment technologies for wastewater use attached growth to remove organic matter and suspended solids.

Packaged Sewage Treatment Plant

This technology is a combination of an aerobic process that utilizes micro-organisms attached to a medium to remove organic matter from wastewater.

Trickling filter and submerged aerated filters (SAF) enables organic material in the wastewater to be absorbed by a population of micro-organisms (aerobic and anaerobic) attached to the medium as biological film.

ADVANTAGES OF THE NANOTECH SEWAGE TREATMENT TECHNOLOGIES:

- Simple, reliable biological processes
- Small footprint compared to traditional systems
- Effective to treat high concentrations of organics
- Final water quality conforms to The South African General Limit
- Final outlet could be treated to achieve The South African Special Limit
- The technology can be above ground (TF) or below ground (SAF) systems.
Activated Carbon (AC) Filtration

It protects other water treatment units such as reverse osmosis membranes and ion exchange resins from possible damage due to oxidation or organic fouling.

Activated carbon is a favored water treatment technique because of its multifunctional nature and the fact that it adds nothing detrimental to the treated water. Nanotech supplies custom designed activated carbon (GAC) filtration units to be used for a specific application or integrated into a turnkey Nanotech water treatment system.

THE UNITS WE SUPPLY HAVE THE FOLLOWING FEATURES:

- Vessels are constructed from GRP/PA
- Units can be containerized or skid mounted
- System control is automated

Granular activated carbon (GAC) is commonly used for removing organics & residual disinfectants in water supplies. This improves the taste of the source as well as minimizes health hazards.
ACTIVATED CARBON SYSTEM TYPICALLY DESIGNED FOR:

- Potable water production
- Process water production
- Waste water treatment
- Tertiary treatment of sewage effluent (for re-use as irrigation, etc.)
- Removal of chlorine in preparation of product water or RO feed water

Clarification

Clarification is the removal of particles from water to make it clear by coagulation, flocculation and sedimentation. Clarifiers or settlers are commonly used in the treatment of potable and waste waters.

Clarifiers form part of a conventional treatment process, either as a primary or secondary treatment, as might be the case with waste water treatment. Nanotech provides different types of clarifiers, which include containerized lamella settlers.

CLARIFIERS ARE TYPICALLY USED AS A SINGLE PROCESS STEP OR AS PART OF MULTIPLE PROCESS STREAM IN:

- Potable water production
- Process water production
- Waste and discharge water treatment
- Secondary treatment of sewage effluent
Membrane Systems

Nanotech designs, manufactures and markets reverse osmosis (RO) membrane systems that change the fundamental economics of seawater desalination and brackish water recovery.

RO Membranes – LG Nano H2O Membranes

Based on breakthrough nanostructured materials and industry-proven polymer technology, LG NanoH2O’s thin-film nanocomposite (“TFN”) Quantum Flux™ membranes dramatically improve desalination energy efficiency and productivity.

Exhibiting the highest permeability (flux) on the market, Quantum Flux membranes match best in class salt rejection while purifying water from a broad range of sources, and fit into new and existing desalination or brackish water plants worldwide.
Reverse Osmosis Systems

Reverse osmosis (RO) technology is used to remove total dissolved solids (TDS) from water. The removal mechanism of RO systems is different to the removal mechanism of filtration due to the fact that physical holes do not exist in the RO membrane. Nanotech Water Solutions have installed numerous RO units as part of a turnkey solution in various industries.

SOME OF THE USES ARE:
- Potable water production
- Process water production (product water, boiler feed water)
- Discharge water recovery (from various sources)

Ultrafiltration (UF)

Ultrafiltration (UF) is a pressure-driven process that removes a variety of suspended solids (TSS) and particles from water, and other solutions.

Some of these solids include bacteria (and some viruses), emulsified oils, metal hydroxides, colloids, emulsions, dispersed material, suspended solids, and other large molecular weight materials.

UF systems very often form part of RO pre-treatment and have the following advantages over conventional systems for RO pre-treatment:

<table>
<thead>
<tr>
<th>UF Membrane Pre-Treatment</th>
<th>Conventional Pre-Treatment</th>
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<tbody>
<tr>
<td>Provides a physical barrier to particles, thereby giving consistently high quality and reliable feed water to the RO.</td>
<td>Removes a proportion of particles but produces poor and inconsistent feed quality to the downstream RO. Operational and feed-dosing problems as well as backwashing operation of sand filters can result in long periods of poor RO feed quality.</td>
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<tr>
<td>Good quality feed to RO means lower frequency of RO cleaning and therefore extended on-stream time.</td>
<td>More frequent RO cleaning required due to poor feed quality, resulting in downtime.</td>
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<tr>
<td>Lifespan of RO membranes is extended, hence membrane replacement cost is lower.</td>
<td>RO membranes may need to be replaced more regularly, resulting in higher operational cost.</td>
</tr>
<tr>
<td>Lower requirements for chemical dosing and for RO cleaning, resulting in lower chemical costs.</td>
<td>Chemical dosing is required in conventional pre-treatment and with more frequent RO cleaning, more chemicals are also used.</td>
</tr>
<tr>
<td>Lower environmental impact.</td>
<td>Extensive use of concrete, large footprint, higher energy use and high chemical waste disposal.</td>
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</tbody>
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**Ultra Pure Water**

Nanotech Water Solutions is well experienced in the production and reticulation of purified water (PW), water for injection (WFI) and pure steam (PS) systems, with technologies ranging from reverse osmosis (RO), continuous electro-deionization (CEDI), distillation, vapor compression distillation and pure steam generators.

- **Pharmaceutical**
  - Pre-treatment options,
  - monitoring of critical parameters,
  - regulatory requirements for product quality,
  - microbiological control,
  - operation and maintenance requirements and
  - lifecycle costs are taken into consideration in the design of all processing steps – from feed water through to point of use.

Equipment offered includes imported treatment sections from Bram-Cor in Italy, complete with Design, Engineering, Fabrication, Commissioning and Validation of systems. Validated purified and water for injection reticulation loop systems are designed, fabricated, installed, commissioned and validated utilizing local expertise, including orbital welding.
Chemical Offering

One of the ways in which Nanotech has grown its share in the chemical market is by offering chemicals mixed at any concentration of the active ingredient, thereby being able to provide a very specific product to their customers to suit individual site needs. Nanotech delivers its chemicals making use of Hazchem Transportation in line with legal requirements.

Chemicals Supplied by Nanotech:

- Boiler Treatment Chemicals
- pH Adjustment Chemicals
- De-scalers/Anti-scalants
- Phosphate Removal Chemicals
- Polymers – Coagulants and Flocculants
- Water Disinfection Chemicals
- Oxygen Scavengers

Since its inception in 2007, Nanotech Water Solutions has been a part of the chemical industry by supplying both specialty and commodity water treatment chemicals to a wide range of applications.
Filters & Media

Nanotech Water Solutions provides quality products relating to the filtration industry and tailors to wide range of applications including the filtration of water, air and gas.

By making use of process information, a suitable filter is identified that adheres to specifications set in terms of pressure, flow rates, temperature, pH, chemical compatibility, etc. Depending on the quality required, one of the following filters will be recommended to suit your process:

- **Large Diameter Pleated Filters**
  - High flow capacity means fewer cartridges and fewer housings, which reduces equipment costs
  - Reduced labour costs due to decrease in change-out frequency
  - Built in handles makes changing fast, safe and easy
  - High surface area pleated design provides lower pressure drop and longer service life
  - Horizontal or vertical housings available

- **Filtration Media**
  - ZEOLITE – improves efficiency of conventional sand filters as replacement media
  - SILICA SAND – various grain sizes suit a wide variety of applications
  - MANGANESE GREENSAND – iron, manganese and hydrogen sulphide removal from groundwater
  - ACTIVATED CARBON – removal of organics, colour, taste and odour from water
Services

With a response time of 24 hours, Nanotech’s service technicians repair instrumentation and provide valuable system-related services to our customers. Nanotech strives for excellent service provision in providing maintenance agreements and servicing of new and existing water treatment units.

Consumables Supply

Consumables including chemicals for continuous dosing or Clean in Place (CIP) procedures; replacement ion exchange resins; replacement filter media and cartridges; calibration solutions; etc. are available from Nanotech.

Maintenance Checks and Services

Monthly or three-monthly checks are done on electrical and mechanical instrumentation and components to ensure the correct functioning of the systems. During these checks services are completed such as replacement of filters cartridges, replacement of filtration media, CIP procedures, heat sanitisations, replacement of diaphragms on valves and more, depending on requirements.

Spare Parts Supply

Spare parts for sewage treatments plants, ultra-filtration plants, reverse osmosis plants, etc. are supplied to Nanotech customers. Parts supplied range from mechanical to electrical components and instrumentation.
Overview

High-quality drinking water, swimming pool water, and industrial wastewater that must be treated to be environmentally harmless require very precise and reliable water circuit components for monitoring and adjusting the water quality.

Over the last 60 years, Lutz-Jesco has earned an outstanding reputation for the development, production, and worldwide installation of these components.

The company has for many years developed innovative solutions for the disinfection of swimming pool and drinking water, as well as urban wastewater treatment.
Core Focus

Products for liquid, solid, & gaseous media from the dosing and conveying technology divisions - such as dosing pumps, peristaltic pumps, gas/vacuum controllers, and dry feeders - daily leave the factory premises for customers around the world.

They manufacture measurement and control assemblies for liquid and gaseous media, complete systems for the disinfection of drinking water, chemically resistant high-performance centrifugal pumps, and customer-specific solutions for dosing applications.

Over 150 different products with several thousand variants are now produced and sold by Lutz-Jesco at their head office in Wedemark.

With other branches in Austria, Hungary, the Netherlands, Great Britain, USA, the United Arab Emirates, and Malaysia, Lutz-Jesco has built up an international sales, support, and production network and is now represented in 70 countries around the world.

In partnership with Nanotech

Nanotech has been awarded the distribution rights for the full product range in the Southern African region. They have been selected for their technical competence and understanding of customer needs and will be supported from Germany where needed, should their clients require it. Nanotech has innovative applications lined up within the Lutz-Jesco chlorinator range.

Mission Statement

Through its expertise in fluid management, Lutz-Jesco is your reliable global provider in all fields of water treatment, whether as a supplier of complete systems, or as a supplier of components for dosing liquids, solids, and gases with their appropriate measuring and metering devices.

We assure customer satisfaction through our worldwide sales and service network, which guarantees a responsive, flexible, & reliable partner.

Lutz-Jesco has been certified ISO 9001:2008 for quality management and ISO 14001:2004 for environmental management.
Chlorinators

Chlorinators are typically used as the final stage of water treatment, referred to as the disinfection stage. The Lutz-Jesco gas-conveying technology is specially designed for chlorination. However divergent the requirements may be, the comprehensive range of well-proven units can deliver doses of chlorine gas or liquid. These chlorination systems meet all the requirements of modern applications and they are distinguished by their reliability and unwavering dosing accuracy.

Small Chlorination Plants

It is possible to achieve extremely precise water disinfection dosing with this DIN-standard chlorination plants.

Thanks to their ease of use and consistent results, chlorine and its compounds have been used successfully in water treatment for decades.
The chlorine gas metering devices ensure maximum safety according to DIN 19606 by operating under full vacuum, starting at the chlorine cylinder, and simultaneous chlorine gas delivery is possible with the C 2211 chlorinators.

A wide range of pumps, complete with mixing and storage tanks, is available to meter liquid products at public baths and swimming pools. Our amperometric, potentiostatic and diaphragm-covered sensors easily measure the concentration of free chlorine, thereby determining the resistance of the water to bacteria.

Besides accurately measuring free chlorine in water, we offer equipment that can measure, record, and control chlorine dioxide, pH value, redox potential and conductivity.

Gas warning devices monitor chlorine concentrations in the air of spaces where chlorinators are installed and every sensor has two alarm levels.

**OUR SMALL CHLORINATION PLANT EQUIPMENT INCLUDES:**
- Full-vacuum chlorinators with a capacity of up to 10 kg of chlorine per hour
- Chlorine gas changeover equipment
- Chlorine control valves
- Chlorine evaporators
- Gas detectors
- Several optional fittings and accessories

## Large Chlorination Plants

Dosing accuracy is extremely well controlled and modular disinfection is possible with the C 2525 and C 2700 chlorinators; these are rated at up to 200 kg of chlorine per hour and they feature separate vacuum regulators.

For fully automatic operation, the C 7520 and C 7522 chlorinators feature automatic changeover valves and uninterruptible chlorine gas supply. Our vacuum chlorinators have been designed according to DIN 19606 and both wall-mounted and freestanding cabinet-type models are available.

**THE LARGE CHLORINATOR PLANT EQUIPMENT INCLUDES:**
- Vacuum chlorinators
- Chlorine control valves
- Changeover valves
- Ejectors
- Chlorine evaporators
- Accessories, like valves, manifolds, expansion cylinders and filters

Lutz-Jesco’s systemised chlorine applications have been designed to be safe and reliable, while being user-friendly and easy to handle.
Areas of application

Lutz-Jesco has developed special solutions for each area of application. The extensive range of products start at cost-effective, magnetically operated diaphragm dosing pumps, to powerful, motor-driven diaphragm dosing pumps and piston dosing pumps for high-pressure requirements.

These are used for dosing fluids with highly fluctuating viscosities, most of which are chemically aggressive and toxic, and some of which are abrasive or give off gases.

It’s time for change, and this new era dosing pumps offer all the features to help you drive that change. With the visual user interface, operating and programming your dosing pumps are easier than ever.
With Lutz-Jesco’s online tools, like the MAGDOS LD and MEMDOS SMART LD calculation wizards, you get results faster than ever. Make suction line, pressure peak, and pressure loss calculations on the fly.

MODBUS is the future of industrial communication and with industrial Ethernet via MODBUS-TCP, you no longer need expensive equipment. You can easily identify devices through adjustable IP addresses and you can remotely control and diagnose dosage pumps via the controller, ensuring optimal system automation.

These dosing pumps are intelligent, flexible, economical, and expandable.

Here is a short overview:

THE SMART SERIES:
Stepper motor-driven diaphragm dosing pumps, available in outputs ranging from 2 to 19.2 litres per hour.

THE ALL-ROUNDER SERIES:
Solenoid-driven diaphragm dosing pumps, available in outputs ranging from 0.5 to 115 litres per hour.

THE REVOLUTIONARY SERIES:
Motor-driven diaphragm dosing pumps, available in outputs ranging from 4 to 1020 litres per hour.

THE ROBUST SERIES:
Motor-driven diaphragm dosing pumps, available in outputs ranging from 3 to 8000 litres per hour.

THE STRONG SERIES:
Piston dosing pumps, available in outputs ranging from 0.1 to 24 600 litres per hour.

THE FLEXIBLE SERIES:
Peristaltic pumps, available in outputs ranging from 7 to 9000 litres per hour.

THE OPTIONAL SERIES:
You have several options for extending your dosing pumps, like specifying a double-diaphragm system, electrical stroke adjustment ATE, or a piston diaphragm system. ATEX versions, frequency converters and separate fans are also offered.
Measuring & Control

Lutz-Jesco has a wide range of equipment to meet dosing control measurement requirements for many applications.

Equipment Range

In many applications, dosing control measurements are required, like water values, uninterrupted transmission of the measurement values, regulator functions, and controls for the dosing units.

Lutz-Jesco has a wide range of equipment to meet these requirements, like fittings, sensors, measuring cells, signal amplifiers, signal generators, measuring devices, and regulators.

TOPAX

The TOPAX DX Multi-channel Controller monitors water value data recorded during water processing, providing real-time control of the metering system.
Every water parameter that is measured can be controlled and these control processes happen very quickly, thanks to the microprocessor-controlled metering amplifier.

One of its principal applications is in the preservation of water quality of outdoor swimming pools where it can analyse free chlorine, pH, ORP, total chlorine, and conductivity. Lutz-Jesco controllers are multi-purpose and 15 of the TOPAX-family controllers can be connected to a PC-supported TopView process control system.

With the TopView computer software, everything is under control, providing for the control and display of networked TOPAX systems via a PC, and enabling remote setting of the controller. Even bonded chlorine data can be logged, measured, calculated, controlled and adjusted online.

### Other

Several water sampling stations are on offer from the EASYPOOL, DCM and PM ranges. EASYPOOL is ideal for private pools, featuring easy operation via a colour graphic display.

All the devices required for measuring and control are built into the station. Depending on the model, a myriad of parameters, including free chlorine, pH, temperatures, and conductivity can be measured.

**THE MEASURING AND CONTROL PRODUCT LINE INCLUDES:**

- TOPAX one-, two-, and multi-channel controllers
- Water sampling stations (EASYPOOL, DCM, and PM)
- Sensor technology, including sensors for free chlorine, total chlorine, and temperature, as well as pH and ORP electrodes, conductivity measuring probes, and flow rate & level sensors
- Fittings, like flow rate and immersion fittings, and fitting blocks
- Accessories, like photometers, TopView, and products like fans, digital frequency inverters, digital teleindication, and transformers