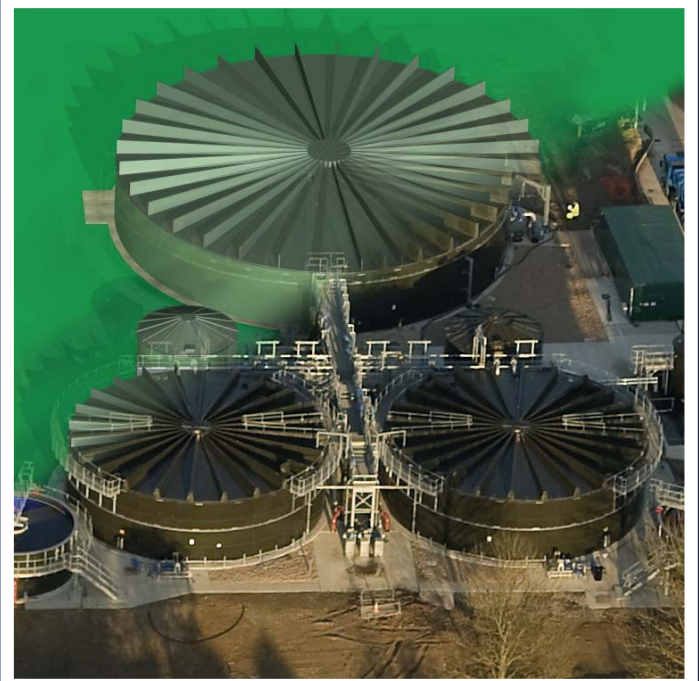


ACWA

INNOVATION IN PROCESS



Company Brochure



What flows is innovation



ACWA is one of the leading UK players delivering innovative sustainable process solutions and technologies for both municipal and industrial clean water, wastewater and bio-solids treatment.

We design and execute resilient cost-effective technologies addressing the needs of our clients and their regulatory drivers whilst helping to address climate change.

ACWA was founded in 1986 and has a head office in Skipton, with group company offices in London, Athens and the Middle East.

Our employees are proud of the knowledge and experience they have been able to bring to the market for over 30 years by providing industrial and municipal water and wastewater systems.

As an experienced process contractor we provide bespoke solutions from initial feasibility, design, estimating and turnkey delivery including process guarantees.

ACWA's Purpose... All Clear Water Ahead

Our purpose - All Clear Water Ahead (ACWA) our name, sums up well our purpose, to contribute to society, by treating water to wholesome drinking standards and to recycle wastewater and bio-solids, responsibly, attaining environmental sustainability.

Through developing our people and enacting our values every day, we apply our process expertise, to solve our clients challenges,

ACWA's Vision

To be a leading sustainable process solutions and technologies provider to the UK Water, Industrial and Food and Beverage Sectors.

Delivering innovative, cost effective,

ACWA was incorporated into Consolidated Contractors Group (CCC) in 1991. CCC is one of the largest construction companies in the world. Founded in 1952 there are now over 110,000 employees. The head office in Athens and there are satellite office in Africa, Central Asia, USA, Middle East and Europe.

We take pride in our history and the way we have helped to shape the processes and technologies used in the management of the world's most valuable resource – water.

Over the years we have invested in research and development providing our clients with sustainable, efficient solutions to help ensure their communities have fresh clean water and that they make the best use of recycled water.

The breadth and depth of our technical knowledge makes us a company that can be relied upon to find the best solutions.

utilising our in-house technologies and those of our supply chain partners, for their customers and communities served.

By delivering innovative, sustainable, value for money solutions each and every day we will improve tomorrow for future generations. Our people are the key to this and we invest and develop them to play their role in society as responsible guardians.

sustainable solutions and technologies to our clients that addresses their needs, meets the challenge of climate change and helps them achieve compliance with their regulatory and statutory obligations.

Our Values



Safe and sustainable

ACWA's Zero Compromise on the health and safety of our people and supply chain are paramount. Our sustainable and affordable solutions will address the challenge of climate change and help strengthen our client relationships;



Open

Integrity and transparency are our way of working, simple, straightforward to deal with and keeping promises are central to our delivery. We build trusting relationships and our ethical behaviour drives our decision making;



Leading

Utilising our in-house process expertise and technologies, allied to those from our supply chain mean we continue to lead industry process solutions that address our clients challenges head on;



Innovative

We will continue to deliver industry innovation through processes and products we offer, building on our legacy, award winning track record to date;



Development Led

Unlocking our peoples' talent and developing their experience are the fulcrum of our business, we create an environment where they can shine. They underpin our delivery and their passion remains our greatest asset;



What we do

ACWA provides expert technical products and services to the water, wastewater and industrial sectors. The company is leading the way on sustainable, innovative solutions for one of the world's most precious resources.

Our expertise combines practical experience with academic knowledge across a wide range of specialisms. These include:

- Design and Build (digital delivery and off-site manufacture)
- Commissioning
- Project Management

We apply our extensive expertise to help our clients find the best sustainable, cost-effective solutions that meet all their requirements. We serve our wholesale water, wastewater and biosolids markets plus industrial food and beverage clients with their water needs. Our primary specialist areas are:

- Water Treatment
- Wastewater Treatment
- Industrial Effluent
- Food and Beverage

In finding the best solutions we look at innovative ideas and turn them into reality producing some of the most sustainable technological solutions on the market.

Our technologies include:

- Nitreat® - Nitreat® Removal Ion Exchange - this is a reversible process by which ions are interchanged between a solid and a liquid with no substantial structural changes in the solid.
- Aqua PYR – Tertiary Solids Removal Filter - this process is a simple filter that can also remove phosphorous using innovative cleaning technology producing low waste and using less power than other filters.
- Amtreat® - High Rate Ammonia Removal - This process is a high-rate activated sludge process designed to treat wastewater streams and sludge liquors containing high concentrations of ammonia.

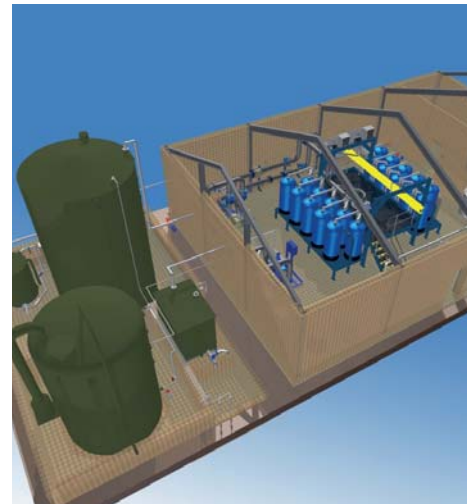


What we do

Design and Build

ACWA's in-house design capability is the architecture on which each project is meticulously built. The latest 3D models create precision imaging of all types of installations from a complex water or effluent treatment plan to a single piece of equipment to be integrated into an existing system.

Through in-house engineers ACWA deliver a complete range of technical design and build expertise across projects and programmes of work that include, civil, mechanical, process and electrical, instrumentation and control and automation.



Project Management

ACWA's team of highly-experienced project managers, engineers and technicians work closely with clients and key project team members to deliver solutions in an efficient, timely, cost-effective and environmentally-responsible manner.

Project management includes ensuring complete compliance with all relevant regulations, both European, national and where relevant, international, while at all times maintaining a clear focus on the project remit.

Our responsibility is to ensure each project is a complete success, both for our client and for the environment. We actively identify and manage risks, issues, changes to requirements and quality standards to guarantee the best possible outcome.

Commissioning

For hands-on commissioning services, ACWA is an industry leader, focussed on complex water and wastewater facilities for municipal and industrial clients. Commissioning is an essential step in project delivery. Without it we cannot have assurance of a quality outcome. Our in-house team provides comprehensive commissioning services getting involved at project start-up to take the project through planning design, construction and turnover, on time and on budget.

ACWA's multi-disciplined knowledge and expertise includes, system design, electrical testing, operations and maintenance (incl. training) as well as systems and process diagnostics, providing an authoritative and effective resource.



Water Treatment

Our water expertise comprehensively covers the filtration spectrum from conventional strainers and filtration systems to the most advanced reverse osmosis and ion exchange technologies.

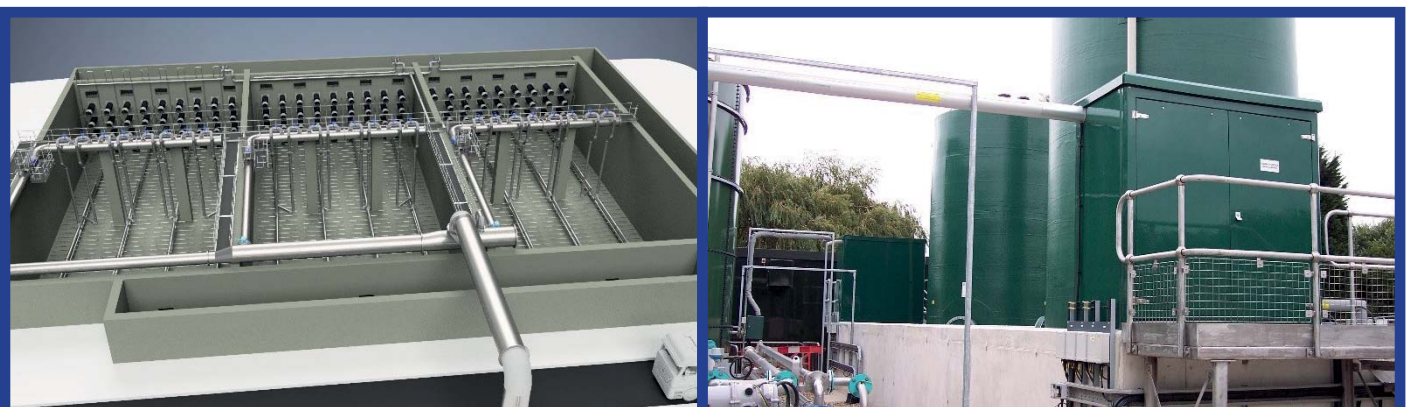
- Microfiltration
- Ultrafiltration
- Nanofiltration
- Reverse Osmosis / Desalination
- Ion Exchange
- Conventional Water Treatment
- Pressure Filters
- Gravity Filters
- Chemical Treatment
- Granular Activated Carbon



Wastewater Treatment

The days of wastewater disposal by methods that had no consideration for the implications to the environment are over. As water scarcity increases and the pressure to comply with ever increasing environmental legislation for effective effluent treatment intensifies, it has never been more important to choose the right wastewater partner who can provide a range of effective processes. ACWA can deliver those solutions.

- Preliminary Treatment
- Aerobic Biological Treatment
- Anaerobic Treatment
- Membrane Bio Reactor
- High-Rate Ammonia Removal (Amtreat®)
- Scrubber Effluent Treatment Plant
- Effluent Re-use
- Tertiary Treatment
- Sludge Treatment





Cliff Quay - Amtreat® High-Rate Ammonia Removal Process Plant

The Cliff Quay site was the first application of the Amtreat® process to a municipal wastewater treatment works (WwTW) in the UK.

Cliff Quay was designed as a non-nitrifying plant, with ammonia discharge consent of 50 mg/l. However, return of liquors from the sludge treatment centres resulted in issues with the final discharge consents. The installation of the sludge liquor treatment plant was to reduce the concentration of ammonia to a level that would not impact on the final discharge consent of the WwTW.

ACWA was awarded this turnkey contract, including civil works from Anglian Water Services to treat the centrate liquors from a sludge treatment centre prior to discharge to the head of the wastewater treatment works.

The Amtreat® system is a purpose-designed high rate activated sludge process that can be specifically used for treating high-strength ammonia wastewaters. By careful control of key design parameters, high ammonia removal efficiencies can be achieved at high loading rates.

The first Amtreat process at a municipal wastewater treatment works in the UK





Keldgate Water Treatment Works Nitreat® Removal Plant

Keldgate Water Treatment Works (WTW) is a vital site located in Yorkshire and with a capacity of 90MI/d it is integral to supplying potable water to the city of Hull.

Keldgate WTW draws groundwater from natural borehole supplies and is located in a rural farming area, which is identified as one of Defra's Nitrate Vulnerable Zones. With the rise in nitrates in the raw water feed to Keldgate WTW, a nitrate removal system was needed to provide a solution to the water quality problem to ensure future compliance with the Drinking Water Inspectorate (DWI).

It was determined that the best solution would be to install a nitrate removal stage

based on Ion Exchange downstream from the existing membrane filtration system.

ACWA's successful solution was to design and install three Nitreat® Skid mounted systems capable of reducing the Nitrate levels within a proportion of the raw water feed down to less than 5mg/l before blending back with the remaining flow to produce a blended treated water quality with a discharging Nitrate level of <42mg/l.

ACWA solution included Salt saturators (brine) and water softener systems along with feed pumps, inline strainers and monitoring stations controlled from a MCC Panel.

The largest plant of its type in the UK





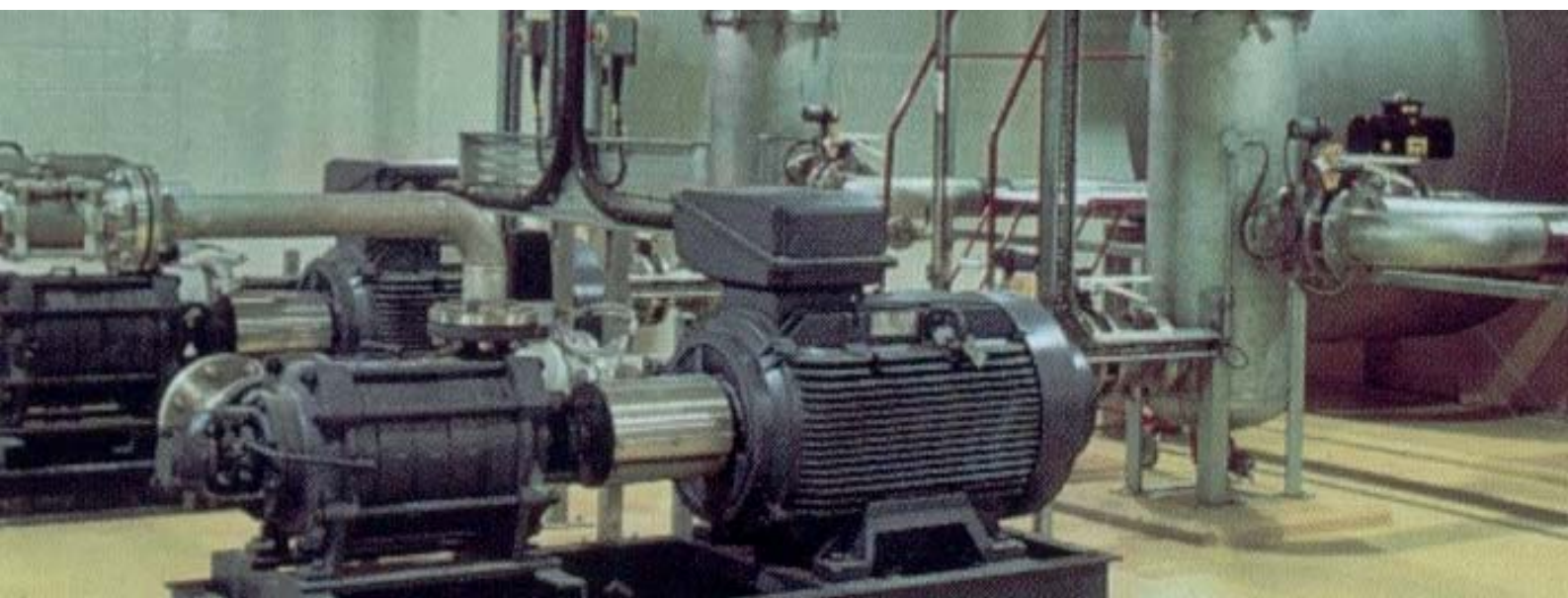
Coors Burton-on-Trent Brewery Reverse Osmosis (RO) Plant

Using the most up-to-date processes and technology, this new RO plant was installed at Coors (previously Bass, previously Carlsberg Tetley Burton Brewery) where it treats deep and shallow well water from numerous sources.

The Brewery's single site brewing and packaging plant offers the most versatile and comprehensive facilities in the UK, producing over 2 million barrels a year of different ales and lagers. The plant operates at an average of 34,000 bottles per hour and 162,000 cans per hour. 530 million pints of beer are produced for the UK.

The decision to install the plant was the result of thorough investigation and an overall view of its water supply, usage and treatment systems carried out at the Burton Upon Trent Brewery with strong emphasis on potential future requirements.

The new RO plant, comprising two identical process streams — each designed to produce 100m³ of permeate per hour incorporate Iron Removal Filtration, Reverse Osmosis and Ultraviolet Sterilisation Systems.



Bateman's Brewery - Memtreat® Membrane Bio Reactor Technology

Like most well established breweries, the Batemans Brewery had a gradual increase in production over the years with the introduction of new seasonal and all year round ales tailored to suit its customer's requirements. With this expansion of production free space was at a premium.

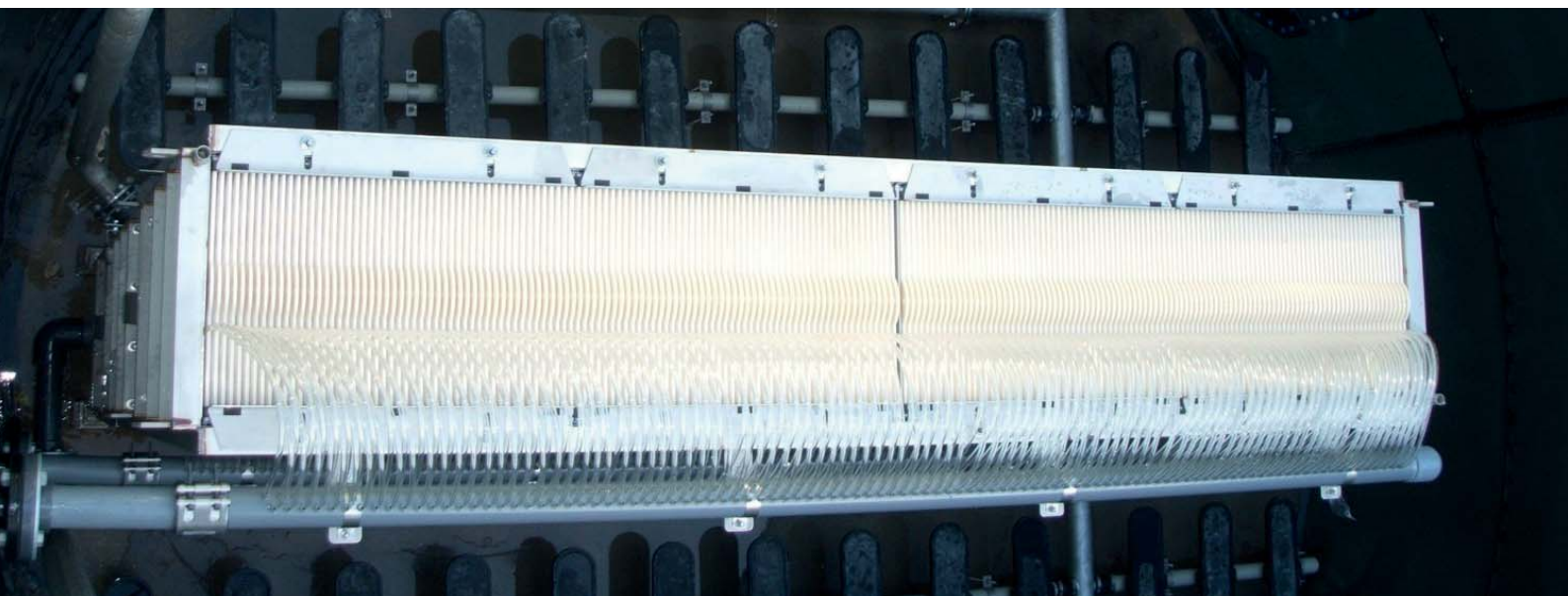
The brewery's waste production had also increased and although the wastewater and wash down waters collection network and interconnecting drains did not need modification, the onsite waste water treatment plant required upgrading to ensure effluent remained within the trade effluent discharge consent to the local sewer.

Although other technologies would be capable of treating the effluent for discharge to sewer, Batemans brewery

opted for ACWA's Memtreat® technology which has a small footprint whilst producing small quantities of sludge and high quality permeate grey water suitable for reuse.

ACWA's successful turnkey solution utilised some existing assets along with multiple new tanks and equipment constructed around the existing treatment system to provide a robust cost effective solution complete automated with the following:

- Existing Raw Balancing
- Screening, Balancing and transfer Systems
- Activated Sludge Biological Treatment
- Membrane Bio Reactor System (submerged membranes)
- Sludge Storage
- Chemical Dosing & Monitoring systems





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