

# Treatment provides efficient use of water and **reduces carbon footprint**

Although rich in natural resources, South Africa's water supply is scarce. Increasing demand for water, and decreasing water quality, make careful water management a priority in the food, beverage and packaging industries. Iza Grek spoke to experts who are able to prioritise environmental concerns and provide effective solutions that address processors' demand for this precious resource.

Our current observation in the market is that there is an increasing need for food and beverage companies to focus on the critical role that water plays in food production as well as the influence it has on the environment, says Mike Dickens, Buckman's food and beverage manager. "Buckman encourages all our customers to focus on water conservation and reduction of their water footprint."

## Reduced footprint

Buckman, a global specialty chemical company with a focus in water technology and involved in several large scale projects in the poultry, beverage and brewery sectors, has been able to bring about improved effluent discharge parameters and water re-use back into the plant to achieve a total water footprint reduction.

These treatment programmes and water management measures can be used in all industries where water is a key factor in production.

Dickens says some of the focus areas have been surrounding effluent treatment programmes, including projects to implement improvements in biological waste performance, and optimising current wastewater to enable re-use of water, as well as mitigating and managing the risks involved in reusing this water.

"All our water treatment projects focus on a combination of the use of advanced chemistries, water

management tools and green technologies, in order to yield increased environmental returns by reducing water consumption as well as reducing CO<sub>2</sub> and energy use. And we practise what we preach.

"The Buckman manufacturing plant in South Africa has reduced water consumption by more than 30%, utilising re-use, rainwater capture, and other technologies," he states. "We have also dedicated ourselves to developing biodegradable, non-toxic and naturally derived products to replace less sustainable options."

## Cost benefits

Dickens says: "A crucial step in the water and energy reduction process is an initial assessment to establish the cost of current practices within a company, and the costs of maintaining those practices. Establishing these baselines allows us to develop short, medium, and long-term strategic sustainability plans for our customers, ensuring that there are significant financial and environmental returns."

Buckman focuses on four improvement areas, namely productivity, quality, sustainability and profitability. "These areas ultimately deliver longer run time and reduced downtime of equipment and machines, greater machine efficiencies, improved maintenance cycles, equipment availability and improved process efficiency," he explains. "In addition

clients will achieve consistent quality and tighter specifications, market requirements, and reduction in CO<sub>2</sub>, water and energy footprints. Profitability is assured in that the life-span of the asset is extended while energy, water and input costs are reduced."

**Buckman: Tel +27 31 736 8915;  
www.buckman.com**

## Reverse osmosis – dairy processors get the most benefit

Dow Water & Process Solutions (DW&PS) has developed a reverse osmosis (RO) as technology that can be of particular benefit to dairy producers. In 2013 the company was invited by a major US dairy producer to measure the performance characteristics of competing standard mesh-wrapped elements and Dow HYPERSELL™ RO elements. "Both the fluid flow requirements and pump energy consumption during whey permeate concentration production were studied," says DW&PS. "The results showed that HYPERSELL delivered reduced flow requirements and lower pump energy consumption than the standard mesh-wrapped elements."

In the case study, HYPERSELL, with its patented hard shell exterior, had reduced flow requirements and pump energy consumption. Projected cost savings were based on a study of a 10-stage, 300-element, 600-gpm, 8-inch whey permeate concentration system.

Libby Dorundo, DW&PS account

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**FLEXI-DISC™ Tubular Cable Conveyors** gently slide fragile foods and non-foods through smooth stainless steel tubing routed horizontally, vertically or at any angle, over short or long distances, dust-free. Single or multiple inlets and outlets.



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**BULK-OUT™ Bulk Bag Dischargers** unload free- and non-free-flowing solids from bulk bags automatically. Allows untying, discharging, retying and collapsing of bulk bags—all dust-free. Available with weigh batching controls.



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**BLOCK-BUSTER™ Bulk Bag Conditioners** loosen materials that have solidified during storage and shipment. Variable height turntable positions bag for hydraulic rams with contoured conditioning plates to press bag on all sides at all heights.



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**SWING-DOWN™, REAR-POST and TWIN-CENTREPOST™ Bulk Bag Fillers** can fill one bulk bag per week or 20 per hour at the lowest cost per bag. Numerous performance options. Available to industrial or sanitary standards.



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**FLEXICON® Flexible Screw Conveyors** transport free- and non-free-flowing bulk solid materials from large pellets to sub-micron powders, including products that pack, cake or smear, with no separation of blends, dust-free at low cost. No bearings contact material. Easy to clean quickly, thoroughly.



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**PNEUMATI-CON® Pneumatic Conveying Systems** move a broad range of bulk materials over short or long distances, between single or multiple inlet and discharge points in low to high capacities. Available as dilute-phase vacuum or positive pressure systems, fully integrated with your process.



# TIP

**TIP-TITE® Container Tipplers** dump bulk material from drums (shown), boxes or other containers into vessels up to 3 metres high. Dust-tight (shown) or open chute models improve efficiency and safety of an age-old task.



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manager of healthcare and specialty nutrition, says: “The case study demonstrated that the annual projected savings of using HYPERSELL RO elements compared to mesh-wrapped elements was \$12,972 (R144,659), per stage. This translates to over \$430 (R4,795) per element in savings annually, or nearly \$36 (R401) per element, per month. These are savings that every dairy producer can take advantage of.”

Dorundo says direct benefits to the plant include increased production, while reducing materials and energy use, thereby decreasing costs. The product line features a state-of-the-art, spiral wound 8-inch reverse osmosis or nanofiltration (NF) membrane encased with a polypropylene hard shell, designed to eliminate channelling and prevent premature degradation and failure of the element.

She explains that when compared to conventional mesh RO or NF membranes, the unique outer shell facilitates more output with improved hydrodynamics through the element, resulting in energy savings, processing efficiencies and clean-in-place (CIP) – cleaning and disinfecting without major disassembly and assembly work. “In addition, the easy-to-handle outer shell design allows for safer and faster loading and removal of elements, saving additional time and labour costs.”

Bill Lloyd, DW &PS technical service manager of speciality nutrition, warns:

“Increased bypass flow raises the flow rate requirements of a system, putting extra demand on the system pumps and increasing the energy requirements and operating cost of the system. With this in mind, HYPERSELL technology does not deform, but actually preserves, the shape of the elements in use. In fact, compared to mesh-wrapped elements, there is up to 64% less bypass area with HYPERSELL, which translates to more feed flows through the element for processing instead of around the element and through the mesh.

### Control bypass flow

According to Lloyd, the industry has learnt that bypass flow is a “necessary evil” in sanitary concentration applications. “It is the fluid that flows between the element and pressure vessel walls that is necessary for maintaining sanitary conditions. However, too much bypass flow reduces the dewatering efficiency of the element. Feed that goes around the element instead of through it does not get dewatered. Bypass flow increases the flow rate requirements of the system, putting extra demand on the system pumps and increasing the energy requirements and operating cost of the system.

“HYPERSELL was developed with these considerations in mind – these unique elements are equipped to reduce the flow requirements of a system by minimising wasted bypass, yet still providing sufficient flow path for effective cleaning. Unlike mesh-wrapped

elements, this results in more feed being allowed to go through the element instead of around it.”

The HYPERSELL RO elements contain high-rejection FT30 membrane, especially effective in dewatering and product concentration. Lloyd says that these elements have been successfully used to process food, beverage, and dairy streams, including dewatering of whey, juice concentration and sugar stream concentration.

HYPERSELL NF elements, on the other hand, are used by food and dairy processors for a variety of desalting, purification and other separations, including decharacterisation of wine, demineralisation of juice, and desalting of broths, or similar food streams.

In addition, the product contains disinfectant properties for clean-in-place (CIP) – cleaning and disinfecting without major disassembly and assembly work. The easy-to-handle outer shell design allows for safer and faster loading and removal of elements.

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**www.dowwaterandprocess.com**

### Trioxigen’s sanitising strength

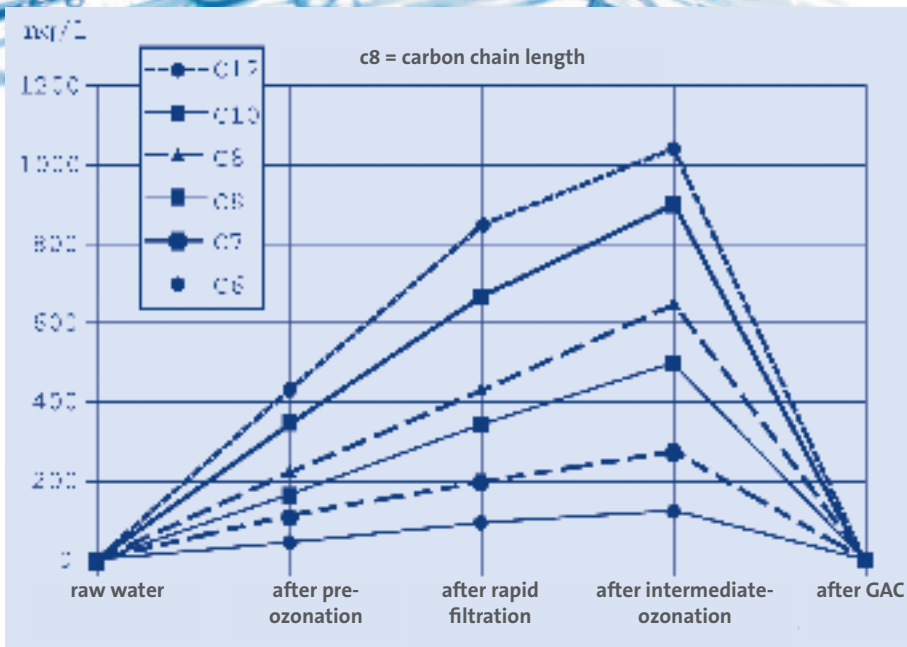
Another sanitisation option is ozone (O<sub>3</sub>) or trioxigen, a molecule composed of three oxygen atoms, temporarily existing in a very unstable and reactive state. “It is the strongest of all molecules available for disinfection in water treatment, and is second only to elemental fluorine in oxidising power,” says Ian Wright of Ozone Services Industries. “Compared to chlorine, the most common water disinfection chemical, ozone is a 52% stronger oxidiser and acts more than 3,000 times faster. Both chlorine and fluorine are highly toxic chemicals.”

Wright says the utilisation of ozone by the food processing industries will continue to grow, especially in light of the fact that ozone is gaining industry acceptance because limitations are being imposed on the use of chlorine and other chemical sanitising agents. “Ozone does not leave a chemical residual which, for food supply, is a distinct advantage.”

Next to fluorine, ozone is known as the most powerful oxidising agent readily available to humans. Ozone is effective at killing micro-

▼ **HYPERSELL delivered reduced flow requirements and lower pump energy consumption than the standard mesh-wrapped elements**





▲ This figure shows the cumulative aldehyde graphs after pre-ozonation, rapid filtration, main ozonation and GAC (granular activated carbon) filtration.

organisms through oxidation of their cell membranes, and most of the pathogenic foodborne microbes are susceptible to this oxidising effect. It has a variety of uses related to agriculture and food processing.

Applications include treatment of process wash waters prior to and during use; treatment of discharge waters; production of sanitary packing ice (of value to seafood products); aquaculture water maintenance; maintenance

of drip irrigation lines; pond water maintenance; treatment of irrigation water prior to use; soil fumigation; washing of peels; sanitation of coolers and storerooms; container or packaging material sanitation; and, spray washing and other wash processes.

Wright says: "Ozone is a very effective germicide; viruses, bacteria, yeast, mould, spores, and aemebocytes are all killed with enough exposure."

Many facilities will be able to adapt or retrofit their system to the use of ozone, removing the chlorine which is now in widespread use. It may be advantageous to add a contact reservoir and some type of filtration apparatus to improve on ozone dissolution and contact, and keep the level of non-target demand substances to a minimum, Wright adds.

**Ozone Services Industries:**

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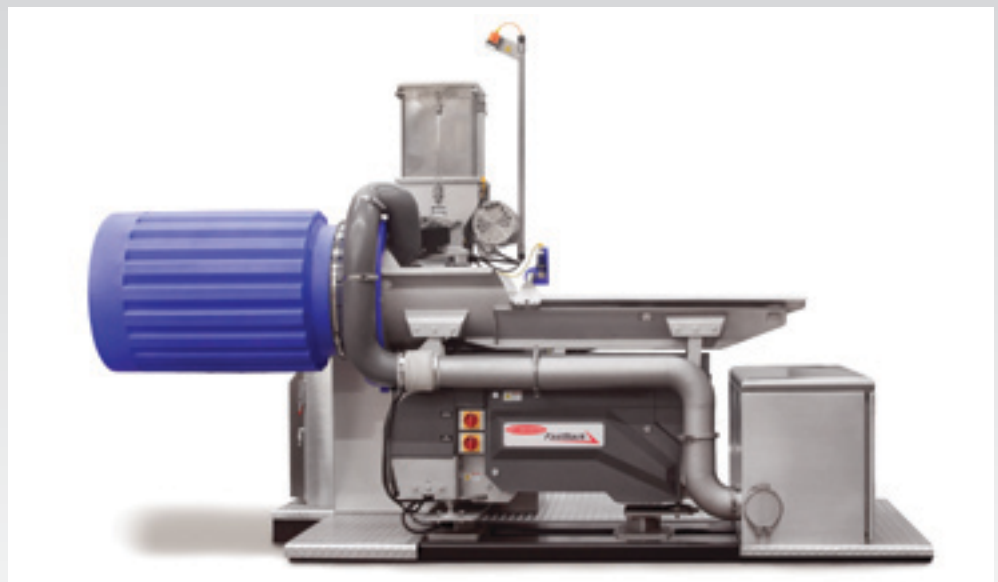
## Corporate

### Modular dust collection ends airborne seasoning pollution

Airborne seasoning dust can create a hazardous work environment, product cross-contamination, and a sanitation nightmare. Now you can eliminate these problems and save energy, and take a big item off your maintenance schedule with Heat and Control's new Modular Dust Collection (MDC) units.

Compared to whole-room dust collection systems, the MDC is more efficient – it can cut energy usage by up to 30% – and costs about 40% less.

Integrated into a new or existing FastBack® Revolution™ On-Machine Seasoning applicator station, this compact unit collects dust at the point of application, before it becomes airborne. It requires



no hood or bracket over the product area, and the product tumble drum doubles as a dust collection duct.

Modular Dust Collection retrofit packages are also

available for most existing Revolution OMS applicators.

For more information on the MDC System, or the FastBack Revolution on-machine seasoning system;

or to test your products in any of our demonstration centres, please contact

Heat and Control at [info@heatandcontrol.com](mailto:info@heatandcontrol.com)  
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