

January/February 2015  
Vol.22 No.6

# what's new in **Food** technology & manufacturing



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Hygienic design

Dairy industry

Nutrigenomics



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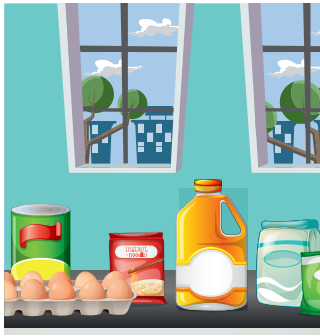


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# What's on during Packaging and Processing Week 2015?



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**2**015 is the 30th anniversary of AUSPACK. As part of the celebrations, the Australian Institute of Packaging (AIP) and the Australian Packaging and Processing Machinery Association (APPMA) have organised a week of events: Packaging and Processing Week 2015.

The week's activities include:

## 2015 APPMA Industry Excellence Awards

Run by the APPMA, the biennial Industry Excellence Awards recognise innovative and outstanding packaging and processing solutions. Companies are recognised for their contribution and outstanding achievements within the wider packaging industry.

Awards categories include:

- Export Achievement
- Design Achievement
- Customer Partnership
- Imported Equipment
- Best New Product
- APPMA Scholarship

Nominations close on 30 January 2015. Submission forms can be accessed via [www.appma.com.au](http://www.appma.com.au) or by emailing [appma@appma.com.au](mailto:appma@appma.com.au).

## 2015 National Technical Forums

The AIP and APPMA are currently planning the details of the 2015 National Technical Forums, which will be held over 24 to 26 March 2015. After a number of successful National Technical Forums run concurrently with the last AUSPACK exhibitions, the 2015 National Technical Forums will deliver a three-day

educational program that will cover a broad range of topics relating to the theme of Open Innovation and Collaboration.

The forums will be divided into breakout sessions to ensure that a diverse range of issues and topics are covered over the three days. The AIP and APPMA are seeking a broad range of speakers from all areas of the packaging, processing, materials and components sectors to ensure the forums offer something for everyone.

To learn more about the 2015 National Technical Forums, visit [www.aipack.com.au](http://www.aipack.com.au) or email [info@aipack.com.au](mailto:info@aipack.com.au).

## 2015 APPMA Scholarship

In conjunction with the AIP, the APPMA is offering a packaging engineer the opportunity to complete a Diploma in Packaging Technology to the value of \$9000. The diploma is an internationally-recognised qualification for those wishing to pursue a career in the packaging industry, or for those already in the industry who wish to extend their knowledge and expertise.

The diploma is a Level 5 qualification that prepares students to take responsibility for packaging operations at any level through the supply chain and can also lead to higher-level study.

Submissions are due by 30 January 2015. To access a submission form, visit [www.appma.com.au](http://www.appma.com.au) or email [appma@appma.com.au](mailto:appma@appma.com.au).

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# Food

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## Older consumers equate 'natural' with 'healthy'

For many older consumers, seeing the word 'natural' on a food label tends to make them think it's more healthy, new research from Canadean shows.

"Older consumers often see 'natural' as a byword for 'organic', 'healthy', 'fresh' and 'wholesome'," said Catherine O'Connor, Canadean analyst.

"However, there are no regulatory criteria when it comes to the word 'natural', which leaves manufacturers more open to put the label 'natural' on their product."

A survey of 2000 consumers in the UK found that 55% of those aged 55+ are looking for 'natural' food choices. Of those seeking 'natural' foods, 60% said they also want healthier food options.

In contrast to general terms like 'natural', products bearing the descriptor 'organic' must be certified as having been produced using organic farming methods. Similarly, for a product to claim to be 'healthy', it must have a reduced quantity of unhealthy ingredients - for instance, using natural sweeteners in place of sugar or having a reduced saturated fat content.



## Tastier food for soldiers with MATS technology

Defence ration packs could get an overhaul thanks to new processing technology that is anticipated to produce high-quality, long-life, shelf-stable foods.

The Defence Science and Technology Organisation (DSTO) will examine the viability of introducing Microwave Assisted Thermal Sterilisation (MATS) technology, which has been shown to produce better-tasting packaged foods in minutes rather than hours.

The research will be conducted in collaboration with the Australian Army and the Centre for Food Innovation, which includes the University of Tasmania and the CSIRO. The study was announced during the opening of DSTO's \$19 million redeveloped nutrition research facility.

The Tasmanian facility, which has provided the Defence Force with a food-science capability for the last 60 years, has undergone a major two-year refurbishment that was completed in October.

"DSTO now has a state-of-the-art food-science laboratory designed to deliver the best nutritional outcomes for defence while enhancing combat ration packs and improving the quality of fresh feeding for our troops," said Assistant Minister for Defence Stuart Robert.

"With its new research facility DSTO is well placed to capitalise on the new MATS technology, which has the potential to provide a superior product not only for defence but for emergency, humanitarian aid, disaster relief and commercial applications.



## First probiotic listed in Food Chemicals Codex

The first probiotic has had a monograph published in the Food Chemical Codex (FCC) by the US Pharmacopeial Convention (USP). This means there are now strain-specific standards for testing the identity, concentration and purity of the GanedenBC<sup>30</sup> (*Bacillus coagulans* GBI-30, 6086) probiotic.

According to Ganeden Biotech, the probiotic monograph is the first of its kind. Due to the unique characteristics of food ingredients made with live organisms and the variances between each probiotic strain, this monograph is specific to GanedenBC<sup>30</sup>.

"The USP is a world-renowned, widely respected organisation whose commitment to science and the use of quality ingredients is recognised and respected around the world," said Mike Bush, Ganeden Biotech's senior vice president.

"We are honoured to receive the first monograph for a probiotic, as it further showcases the strong science supporting GanedenBC<sup>30</sup> and illustrates our commitment to the use of only high-quality ingredients in the global food and beverage industry."

The USP standards are housed in the FCC, a reference guide with the vital measures and analytical methods to validate and determine the quality of food ingredients. The FCC monographs assist manufacturers in ensuring that ingredients are genuine, therefore assuring consumers of a safe food supply chain.

For more information about the USP and the FCC, visit [www.usp.org](http://www.usp.org).







## Are Australian producers ready to capitalise on the Chinese FTA?

Australia's beef, dairy and wine producers will be key beneficiaries of the Australia-China free trade agreement, according to Grant Thornton National Head of Food & Beverage Tony Pititto.

However, they need to consider whether they are well positioned to take their place on the world stage as premium providers to the Chinese market, Pititto says.

"Australian food & agri producers will now need to ensure that they have undertaken appropriate market research to fully understand the opportunities which will be opening up in China and its various markets," he said.

"Whilst the FTA will help Australian producers decrease their reliance on the Australian market and its strong supermarket position, developing the right relationships with Chinese customers will be crucial to Australian companies being able to take advantage of greater access to Chinese markets."

Pititto says the FTA could spell opportunities for foreign investment in our beef, dairy and wine sectors.

"Our global research indicates approximately one-third of all Australian food and beverage companies surveyed will look at acquisitions in the next 12 months, and a further third will look at selling their organisations or businesses over the same period," he said.



## Growers were pressured by Woolies, despite ACCC findings, says AUSVEG

Vegetable industry body AUSVEG maintains that growers were unfairly pressured by Woolworths to contribute a levy to fund a marketing campaign featuring Jamie Oliver.

Australian Competition and Consumer Commission (ACCC) Chairman Rod Sims stated that the ACCC had not found evidence that Australian growers were unfairly pressured by the supermarket giant to contribute a 40-cent levy per crate of produce supplied. However, AUSVEG maintains that these claims are true.

"We know this to be the case because leading growers from around the country approached us with their concerns, and that's why we went public," said AUSVEG spokesperson Andrew MacDonald.

"From the outset, AUSVEG maintained that many growers were afraid to go on the public record regarding their concerns about contributing to the campaign because they were worried about possible reprisals in terms of their future business dealings with the supermarket giant.

"This is completely understandable given [that] Woolworths is the largest customer for many of these growers."

## Nestlé unveils new \$40 million investment at Milo factory

Nestlé has unveiled the final stage of the expansion of its Smithtown factory on the NSW mid-north coast, which includes new facilities to house state-of-the-art technology that is rumoured to be the first of its kind in Australia.

The company has spent \$53 million on the factory since 2011, with the majority of this dedicated to bringing production of the Nescafé Café Menu to Smithtown after a foot and mouth disease outbreak in Korea in 2010. Nearly 25 full-time positions have been created since 2011.

"The decision to create this substantial investment and a long-term vision for our business in Smithtown is a tribute to the region, its residents and the local economy," said Nestlé Australia's Business Executive Manager - Beverages Evan Gongolidis.

"Smithtown has proved to be a wonderful home for us to produce iconic products such as Milo that have been enjoyed in the homes of generations of Australians."

"Nestlé is not only one of the biggest employers in the area but has also been in Smithtown for more than 90 years - with many more to come," said State Member for Oxley Andrew Stoner.

"This region will continue to be prosperous and we welcome and thank Nestlé's continued support to our local economy."

The Smithtown factory has been in operation since 2011 and is the birthplace of Milo. The factory also produces Nesquik and Nestlé Malted Milk.



# Food

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## Could use-by dates be past their use-by date?

Electronic circuits could take the guesswork out of knowing whether milk is actually out of date or whether it has a day or two left - no smelling required.

Researchers from Nanyang Technological University (NTU) in Singapore have successfully printed complex electronic circuits using a common t-shirt printer. The electronic circuits can be printed in layers on top of everyday flexible materials such as plastic, aluminium foil and even paper.

"This means we can have smarter products, such as a carton that tells you exactly when the milk expires, a bandage that prompts you when it is time for a redressing and smart patches that can monitor life signals like your heart rate," said Associate Professor Joseph Chang from NTU's School of Electrical and Electronic Engineering, who led the research group.

"We are not competing with high-end processors like those found in smartphones and electronic devices. Instead, we complement them with cheaply printed circuits that cost mere cents instead of dollars, making disposable electronics a reality."

## No longer a trend? Organic purchases hit record high in Australia

Organic food isn't just a trend any more - consumption of organic food, cosmetics and household products has hit an all-time high, according to the latest biennial Australian Organic industry report.

Now valued at more than \$1.72 billion, the organic industry has seen a 15.4% compound annual growth rate (CAGR) since 2009.

Key findings of the report include:

- Dairy has been the fastest growing organic category in 2014, estimated to be worth \$113 million.
- Beef is the second-fastest growing sector, with compound growth of 127% in 2011-14. Its value in 2014 was estimated at \$198 million.
- Now worth \$117 million, wine grape production increased by 120% between 2011 and 2014.
- The organic grain category has grown by 20%, with total crop values lifting by 67% in three years.

"One of the most significant findings was that 69% of primary food shoppers in Australia claim to have bought at least one certified organic product in the past 12 months. This demonstrates that organics are gaining greater penetration beyond the group of consumers who have traditionally purchased them," said Australian Organic Chairman Dr Andrew Monk.



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## Egg industry pressured to review free-range claims

The Australian Competition and Consumer Commission (ACCC) is urging the egg industry to review its free-range claims after a free-range egg producer was fined \$300,000 for falsely labelling its eggs as 'free range'.

ACCC Chairman Rod Sims says the ACCC will be contacting egg suppliers in writing.

"We are encouraging them to consider whether they should review the words and images used on their free-range egg cartons and any advertising claims about their free-range eggs," said Sims.

"Some have expressed concern that there is no government standard that producers need to meet to be a free-range producer. We see no need for any standard.

"In the Pirovic case the court ruled that free range means the birds can and do go outside on most days. It is up to producers to determine how to meet this common sense definition.

"Any prescriptive standard beyond this would likely have requirements that are not relevant to what consumers understand free range to mean."

Sims also said that the agricultural sector stands to gain from reforms proposed as part of the Harper Competition Review.



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# Bacterial slime

## or what to feed the world after catastrophic crop failure

Even when looking at doomsday scenarios - like super-volcanoes, abrupt climate change and nuclear winter - society's forecast isn't horrific according to Michigan Technological University professor Joshua Pearce.

"We researched the worst cases and asked, 'Is it possible to still feed everybody after a complete collapse of the agricultural system?'" Pearce says. After looking at five crop-destroying catastrophes (sudden climate change, super-weeds, super-bacteria, super-pests and super-pathogens) and three sunlight-extinguishing events (super-volcano eruption, asteroid or comet impact, and nuclear winter), Pearce says we have a way to feed everyone on Earth for five years. That's enough time for the planet to recover, allowing a gradual return to the agricultural system we use today.

Usually solutions focus on food storage, the survivalist method of putting cans in closets. But for global catastrophes, where you'd need at least five years of supplies, that big a stockpile is simply unachievable. However, in his new book *Feeding Everyone No Matter What*, Pearce says that even if the sun was blacked out for years, killing all plants, we're still okay sans brimming bunkers of canned goods.

"We looked purely at technical viability - ignoring all the social issues that currently cause millions to go hungry and die every year," he says.

### Bacterial slime and bugs

"We came up with two primary classes of solutions," Pearce says. "We can convert existing fossil fuels to food by growing bacteria on top of it - then either eat the bacterial slime or feed it to rats and bugs and then eat them." The second (and easier) set of solutions uses partial rotting of woody plant fibre

to either grow mushrooms or feed to insects, rats, cows, deer or chickens. "The trees are all dying from the lack of light anyway. If we use dead trees as an input, we can feed beetles or rats and then feed them to something else higher on the food chain," Pearce says. "Or just eat the bugs."

Of course, it would take some time to get such a new system established. In the interim, we could survive on fungi (mushrooms), bacteria and leaves.


It wouldn't be a life devoid of little luxuries either, he says. "We could extract sugar from the bacterial slime and carbonate it for soft drinks. We'd still have food scientists, too, who could make almost anything taste like bacon or tofurkey. It wouldn't be so bad."

Pearce is confident we have the technical know-how to get ourselves through almost any predictable catastrophe. Perhaps his most reassuring conclusion, though, is that the two most likely global catastrophes (nuclear winter and abrupt climate change) are the ones we have the most control over.

"We don't have to blow ourselves to smithereens if we don't want to," he jokes.

Pearce hopes his new book will help prevent the worst cases from actually happening and provide solutions to help people survive lesser catastrophes.

"The end of the book poses questions that we need to look at quickly," says Pearce. "We can feed everyone if we cooperate and do a little thinking ahead of time - not in the dark when everyone is screaming. Life could continue to go on normally. Just a little dimmer."

*Feeding Everyone No Matter What: Managing Food Security After Global Catastrophe* is coauthored by Pearce and David Denkenberger, research associate at the Global Catastrophic Risk Institute. 



# Processing





# Why process food?

Johannes Baensch

**When I was a child, my grandmother would make coffee using the only method available to her at the time, by roasting the raw beans in a frying pan on the stove.**

**T**he beans had to be heated to a very high temperature and mixed continuously to avoid scorching, or uneven roasting. Afterwards they had to be cooled quickly, to stop them over-roasting. They then needed to be ground, the grounds mixed with hot water, and finally, the liquid coffee separated from the used grounds.

All in all, it was a time-consuming process that required a good deal of effort and concentration to get right.

## More convenient

My grandmother enjoyed a good cup of coffee, but she was not an expert coffee roaster. Nor did she want to be, much like the majority of people who love drinking it. While it's true that today, some people are passionate about roasting and grinding their favourite drink themselves, most don't have the time or the desire to do so.

That's where our industry has made a difference - replacing labour-intensive methods with more efficient ones and creating consistent, often tastier, products as a result.

## Delicate balance

What's interesting is that when a person makes a perfect cup of coffee by hand, the element of craftsmanship is acknowledged. But when the same process is performed industrially, there's little recognition of the expertise involved.

In fact, most industrial food processing techniques are the outcome of years of research and development. Many are

modelled on artisanal and traditional methods, and are often a delicate balance of science and art.

## Local knowledge

Take fermentation, thought to be one of the oldest recorded techniques for food preservation. Fermentation is a method of biotransformation - in other words, the use of natural processes to improve the flavour, digestibility or shelf-life of food ingredients.

It has been used in many products worldwide for centuries, particularly in traditional Asian dishes.

These include tempeh, traditional Indonesian cuisine made from fermented soy beans, and kimchi, fermented vegetables with chilli, which is particularly popular in Korea.

At Nestlé we use natural wheat gluten fermentation to produce our Maggi liquid seasoning and soya fermentation for our Maggi bouillon cubes in West Africa.

We know that the best way to understand traditional methods of processing ingredients is to work with the local cultures they originate from. That's why we partner with research institutes, universities and government agencies worldwide, to learn from local knowledge while sharing our own experience.

## Alternative proteins

But food production cannot only be about working with recognisable ingredients. As the global population expands, demand increases, and our resources become scarcer, it's



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*This is why some food processors, including Nestlé, do not only focus on preserving the nutritional value of raw materials. They also find ways to enhance it.*

clear that we must identify new, long-term sources of essential nutrients.

Meat and fish are generally people's main sources of protein, but their sustainability is debatable. We need to look for plant and vegetable alternatives. This doesn't only mean cultivating different raw materials. It requires an in-depth understanding of their properties and how to get the best from them at every stage of the value chain.

### Enhanced nutrition

In many parts of the world, urban centres are expanding rapidly and increasing the distance from farm to fork within local regions. This is why some food processors, including Nestlé, do not only focus on preserving the nutritional value of raw materials. They also find ways to enhance it.

Fortifying foods with micronutrients that are lacking in specific populations' diets is one technique. And as technology, and our knowledge, continue to advance, processing


should enable us to do more to target the right nutrition, to the right people, at the right time.

### Ancient practices

People have been processing food for thousands of years - cooking with fire, drying fruit and curing meat with salt - as much to preserve taste as to ensure safety.

In the west, we've come to expect that the food we buy is safe to eat, but it wasn't always the case. Before the widespread introduction of pasteurisation, raw milk was a common source of bacteria that caused deadly tuberculosis and other foodborne illnesses.

Still today, in some parts of the world, many people don't enjoy the luxury of knowing that the food they buy has gone through rigorous controls and checks. So whether our food is extremely sophisticated, or fairly rudimentary, the challenge is essentially the same.

It is not enough to grow and harvest raw materials. You need the expert know-how to turn them into safe, tasty, nutritious and convenient ingredients. Processed products may make our lives easier, but the skills and talent required to produce them are harder to come by than you might think. 

*Johannes Baensch is Nestlé Global Head of Research and Development.*

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## High-power flat air nozzle

EXAIR's 1" High Power Stainless Steel Flat Super Air Nozzle produces a flat 25 mm wide airstream with a blowing force of 462 g when mounted 305 mm from the target. The design of the nozzle makes it suitable for tight spaces. The Type 316 stainless steel construction is suitable for corrosive, high temperature, food, pharmaceutical and chemical environments.

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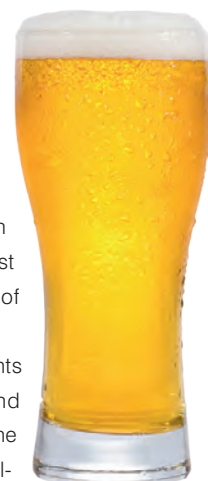
## Beer recovery plants

GEA Filtration has developed beer recovery plants which recover beer from surplus yeast in tank bottoms by means of cross-flow membrane filtration.

The membrane filtration plants use ceramic membranes and have a compact skid design. The modular plant design is available in a range of sizes to cover breweries of any capacity. The plants are easy to clean and sanitise, due to chemical- and temperature-stable membranes, and feature an integrated automatic control system.

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# Blooming chocolate

Chocolate products can lose their gloss after a certain amount of storage time has passed and develop 'bloom' - a creamy grey/white patina. Now, armed with sophisticated analysis, companies can effectively protect their products from developing this unaesthetic coating or bloom.

**T**here are two main types of chocolate bloom - sugar and fat. Each has different causes. However, no matter the type of bloom, the surface of the chocolate will become unappealing and will have a mottled or hazy look. If fat bloom is present, it is likely that the texture of the chocolate may have changed from when it was originally moulded.

## Sugar bloom

Sugar bloom is caused by moisture coming into contact with the chocolate. When water comes into contact with chocolate, it dissolves the sugar on the surface of the chocolate. As the water dries, the dissolved sugar crystallises and precipitates onto the surface of the chocolate. The resulting small sugar crystals give the chocolate a dusty appearance.

The most obvious cause of sugar bloom is if water was inadvertently spilled on the chocolate or the chocolate came into contact with or was placed on something wet. Another common cause is condensation - for example, chilled chocolate will condense moisture from the air and the condensation will cause the sugar bloom. Sugar bloom may also occur if the chocolate has been in an environment with too high humidity.

The best way to avoid sugar bloom is to store chocolate in low-humidity environments with a stable temperature to avoid the risk of condensation.

## Fat bloom

Fat bloom typically appears as lighter colour blotches on the chocolate and, unlike sugar bloom, is not always caused by a

simple set of circumstances. Fat bloom is more complicated, and it may be difficult to discover the actual source of the problem.

During manufacture, the chocolate is tempered to ensure that only stable crystals of the cocoa butter form, while the chocolate hardens.

If chocolate is not tempered, the unstable forms of cocoa butter crystal will form, most notably the  $\beta$ -Prime and  $\alpha$  forms. After the cocoa butter hardens, these unstable forms will slowly change their forms to the stable  $\beta$  form. The  $\beta$  crystals are slightly smaller than the  $\beta$ -Prime or  $\alpha$  forms, so that when this transition occurs, the chocolate contracts. The new stable  $\beta$  crystals then form, projecting above the surface of the chocolate, visible as bloom.

If the chocolate is stored in a room where the temperature fluctuates near the melting temperature of the stable  $\beta$  crystals, two additional types of fat bloom may form. In the first, some of the  $\beta$  crystals melt. When they recrystallise, they recrystallise slowly, since the ambient temperature is close to that of the chocolate. This allows the crystals to grow much larger than the original small, compact crystals. In addition to projecting above the surface of the chocolate, these larger crystals may displace cocoa butter, forcing it to the surface.

The second type of bloom is created when the crystals have softened instead of melted. It is during this period that cocoa butter that has slightly melted migrates towards the surface. When it breaks the surface, it pools ever so slightly, and when it cools the cocoa butter appears as spots.





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Fat bloom can also occur in cocoa powder as the powder contains between 12-20% cocoa butter. Since some cocoa butter is present, it must be tempered during manufacturing, just as chocolate is. Cocoa powder that has been improperly tempered or undergone temperature fluctuations may cause bleaching of the cocoa powder and may cause clumping as the cocoa butter helps the particles of the cocoa powder adhere to each other. As with chocolate, when bloom occurs it does not affect the edibility of the cocoa powder but may have an aesthetic impact.

Studies on fat bloom indicate that the bloom consists of large, single cocoa butter crystals or collections of crystals of the stable  $\beta$  form of cocoa butter. Other forms of cocoa butter crystals are not present in fat bloom.

### Is it fat or sugar bloom?

One way you can easily check to see if a piece of chocolate has undergone sugar bloom or fat bloom is to lick your finger and touch it to the chocolate. If the dusty appearance disappears, then it is sugar bloom. (The moisture on your finger dissolved the sugar crystals on the chocolate.) If the bloom remains, then it is fat bloom.

### Fixing the fat formulae

Fat bloom is often mistaken for mould, but it really has nothing to do with this. It has no effect on the taste of the product and the product is not ruined by it.

Fat bloom does not appear immediately after production, but instead appears days or even weeks later. It can be one

of the consequences that come from storage that is too warm or under temperatures that sharply fluctuate,” explains Wolfgang Danzl, food quality expert at the Fraunhofer Institute for Process Engineering and Packaging IVV in Freising. The researcher and his team are helping food makers with their efforts to improve the resistance of their products with chocolate coatings from bloom.

Small and medium-sized enterprises suffer the greatest impact, because they produce a majority of the confections and baked goods. Chocolate coatings represent an effective technique for refining these products. In the process, the pastries, cakes, waffles and bars are run through a fluid, pre-crystallised chocolate stream. They then have to swiftly crystallise within the cooling channel - in other words, solidify - so that a shiny surface results. IVV researchers discovered that this stage is precisely where fat bloom can arise.


“It is not uncommon for residual chocolate at the end of the coating stage to flow right back to the start. During this recycling, the shortening used for filling and baking is washed off. We were able to prove that for the first time. To obtain the evidence, we developed commensurate methodology. Until now, there were hardly any investigations on coating systems,” Danzl explains.

The fat components from the fillings could penetrate to the surface of the confection and accumulate in the coating. This process is also called ‘fat migration’. Fine fat crystals accumulate at the surface and thus change the crystallisation properties of the chocolate coating.

“The filling fats cause the chocolate to crystallise more slowly, making the coating softer. This allows the fat to accumulate even more efficiently. Fat migration is facilitated, which in turn can lead to fat bloom formation,” the researcher explains.

### Soft coating from nut oil and coconut oil

The type and quantity of the filling fats influences the chocolate’s crystallisation behaviour. Cocoa butter with a minimum proportion of other fats and oils is highly predisposed to fat bloom. Most of all, nut oil and lauric fats tend to soften the chocolate coating, the IVV researchers determined through their lab testing. This includes coconut oil and palm kernel fat. They contain lauric acid, which does not mix well with the cocoa butter. By unravelling, the crystalline structure is destroyed; as a result, these white flecks emerge.

Producers can arrange to have the food experts at IVV investigate their chocolates at the laboratory. For this purpose, they have to remove the fluid mass from the tank during production. The researchers are capable of evaluating the quality of the chocolates, identifying the proportion of filling fat and analysing precisely how great the risk is for fat bloom to occur. They advise the companies about which measures to implement to optimise the production processes. Depending on the application, the phenomenon can be counteracted by adjusting the temperature gauge, the refrigeration channel or the backflow. Evaluating the baking and filling fats could furthermore help improve recipes. 

## Double the efficiency for Brazilian brewer

With a market share of around 12% and an annual output of around 16 million hectolitres, Grupo Petrópolis is Brazil's second-largest brewing conglomerate. The company continues to expand, with two brand-new breweries constructed in mid-2013 and early 2014, each with two filling lines and a capacity of six million hectolitres.

These two breweries are identical in construction and were ordered in entirety from Krones AG. The company's four other production facilities include a total of 11 filling machines from Krones. In the new facilities, a 62,000 bph (bottles per hour) and a 128,000 cph (cans per hour) canning line have been installed - the fastest owned by the company.

Following a construction line of approximately 12 months, the first brew was produced in late July 2013 from the Alagoinhas facility. The Itapissuma facility went online in 2014, with the first brew produced in April.

Krones supplied and installed every piece of equipment at these facilities, beginning with the brewhouse, continuing with the cellars and filtration kit, all the way through to the filling operation.

"In order to assure the quality level of our products, it's vital for the Petrópolis Group firstly to downsize its energy consumption and secondly to keep the consumption of processing and operating materials at a low level," said Grupo Petrópolis proprietor Walter Faria.

"We have the biggest filling lines in the world, and in this segment we always endeavour to incorporate the very latest innovations. We invariably opt for machinery and lines with leading-edge technology and strive to optimise the changeover times on our new lines. We operate with highly disparate types of container and pre-sort them upstream of the bottle washer, so as to reduce water consumption."

The process sections of the two new facilities feature Krones' latest solutions for beer production. Each of these brewing facilities has been dimensioned for a final capacity of six million hectolitres, which is achieved in each facility by two identical brewing lines arranged in parallel.

Each of these two brewing lines begins with a Variomill wet mill rated at 20 tons per hour. Pre-mashing is performed

in a ShakesBeer wort copper, which reportedly improves taste stability. The Pegasus C lautering system filters the beer wort to a high standard of quality with a minimised content of solids. To dispose of the wet spent grains from the lauter tuns, two intermediate tanks are provided at each brewery, plus a 300 m<sup>3</sup> silo. The brewhouse also features two first-wort tanks and two product tanks.

A plate heat exchanger rated at 3600 hL/h heats up the lautering wort. The wort copper is fitted with the Stromboli

internal boiling system, which consumes up to 40% less energy. Each process section is supplemented by two hop-supply vessels per wort copper. A storage tank for high maltose enables approximately 10 tons of high maltose to be admixed to each brew. The facility is also set up for admixing rice and maize by means of a rice boiler. Furthermore, there is a shared whirlpool for removing the hot break and a wort cooler rated at 1500 hL/h, these two serving both of the brewing lines.

The two brewing lines operate with high gravity at 18.5° Plato and produce 16 brews a day, each comprising 1100 hL of cold wort. The brewhouse possesses its own CIP system with two caustic tanks, one acid tank and one water tank. Each of the lines is rounded off by tanks for hot and cold water.

In the cold section, the yeast system features a cylindro-conical yeast propagator, a plate heat exchanger for sterilising the wort, eight yeast storage tanks and a waste yeast tank.

The diatomite candle filter installed, a Twin Flow System (TFS) rated at 640 hL/h, provides filtration with long cycles for beer stability. This diatomite filter system is supplemented by a beer cooler, a separator, a PVPP stabiliser and a trap filter, plus systems for carbonating and deaerating the product. Evoguard valve technology for hygienic process applications has been installed throughout the cold section. A CIP system with 11 different tanks assures automatic cleaning throughout.

Krones manufactured 18 cylindro-conical combined fermentation and storage tanks on-site, plus 12 bright-beer tanks.

Each of the breweries features a returnable glass designed to handle three formats at an agreed minimum efficiency of 90%.







Highlights here include the latest-generation Lavatec bottle washer, with its low consumption of water and chemicals, plus two modularised labellers from the Solomodule range. There is a Checkmat FEM-G container inspector for each labeller. The line also features a Checkmat FM-G container inspector downstream of the filler, an empty-bottle inspector, plus a Checkmat crate inspector. Besides the Mecafill VKP-V filler and the Lavatec bottle washer, the wet end likewise includes a pack cleaning machine and a SHIELD tunnel pasteuriser. In the dry end, the line features a Modulpal Universal depalletiser. The crates of empties are then unpacked by a Smartpac.

One of the line's most distinctive features is that the bottles are presorted by means of two Sekamat 704 D+L sorters, which are installed directly at the conveyor and identify the passing bottles in non-contact mode against their individually specific criteria, ensuring that all foreign bottles are rejected. A separate, smaller Smartpac packs foreign bottles in crates for resale. A second Smartpac packs the brewery's own full bottles in returnable crates. A Variopac Pro has also been installed, which packs the non-returnable bottles and the premium-beer bottles in wraparound cartons. At the end of the line, two Modulpal palletisers are responsible for stacking the crates on pallets.

Each of the two breweries has been equipped with a canning line designed to handle four formats. The minimum efficiency agreed for the acceptance test was 92%. These are the fastest canning lines Krones has ever built, managing with just a single volumetric filler, a volumetric VOC, combined with a Ferrum seamer. As in all the other lines, the canning line also features a SHIELD tunnel pasteuriser for maximised levels of product

quality combined with low water consumption. With the exception of the filler and the pasteuriser, all the other machines in the canning line are installed in pairs, to ensure an output of 128,000 cph. This relates to the empty-can inspectors and the Checkmat 731 FEM-G container inspectors. The hygiene seals for the pull-tabs are applied by no fewer than three Taxomatic labellers. For end-of-the-line packaging, two Variopac Pro FS film shrink-wrappers have been installed. In the packing zone, two Robobox layer preparation units for highly flexible, ultra-accurate layer pattern creation have been integrated and coupled with a Modulpal 2A palletiser.

The overall equipment effectiveness (OEE) tool provides a central report on what has caused malfunctions, with the requisite proportions of each machine involved in filler standstills. This applies both for the data automatically collected by the LDS and for the causes of standstills allocated in OEE computations. For unscheduled filler stops, certain people within the Petrópolis Group will be notified by email. If a shift in the OEE has not been acknowledged within 8 h after the end of that shift, a mail alert will be generated.

Key performance indicators for the month in question are displayed in the standard reports generated by the corresponding tool, together with any deviations and the actual value highlighted. The display shows key performance indicators for the individual machines, such as availability or the number of malfunctions. There are options for different time references, such as day, week, month or year.

*Krones (Thailand) Co Ltd*  
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### **Rotary seal profiles**

Oz Seals has released four rotary seal profiles into its custom sealing range: BP3C, BP3DC, BPHPA and BPHPB. Suitable for rotary applications in any industry, the rotary seals can be designed for speeds of up to 10 m/s and up to 100 bar pressure.

The recommended materials for these profiles are NBR, HNBR, Oz Super Red Polymer (ORSP), Viton and Aflas Extreme, depending on the media. They may be accompanied with a TMCF or Oz Monyt Super Polyurethane carrier, which holds the elastomeric part, prevents rotation and locks it stationary into the housing. The profiles can be produced in any size.

#### **Oz Seals**

[www.ozseals.com](http://www.ozseals.com)

### **Pulsed electric field technology for food processing**

Pulsed Electric Field (PEF) technology, developed by Elea, exposes microorganisms, plant or animal tissue to a pulsed electrical field, which punctures the cell membrane, allowing access to its contents.

Because heat is minimised, products have a longer shelf life, while maintaining better nutritional value through the preservation of pigments, antioxidants and vitamins.

Loss of cell membrane barrier function causes microbial kill, which allows microbial decontamination of heat-sensitive liquids while retaining their sensorial and functional value.

When used with solids, PEF enables a targeted and controllable structural modification. Food becomes more homogeneous, evening the structure and resulting in the reduction of seasonal variation. Examples include: evening the structural variations in potato resulting in a smoother mash; improved cutting of crisps resulting in a smoother surface and less colouration; reduced oil uptake and water retention to reduce frying times and create crisper crisps.

The technology enables sugar removal, which reduces browning and enables the production of 'healthier' products. The targeted structural modification also allows use of tough and inconsistent raw materials such as sweet potato, turnip and beetroot.

The softer tissue structure allows the use of different cutters to create interesting product shapes.

#### **Elea**

[www.elea-technology.eu](http://www.elea-technology.eu)



## Upgraded user interface for optical sorter

TOMRA Sorting Solutions has upgraded the user interface design for the company's Halo optical sorter.

The interface is designed to simplify sorting adjustments. Each user can define and name their own sorting criteria, with defects of different intensity and size typically being set up in different 'feature boxes' for critical or minor defects such as green or brown.

Operators can also combine the size of the product and colour defect levels to manipulate the sort of the potatoes recovered. For example, operators are able to combine a small defect (colour) on a small potato (length) as waste, but that same small defect on a bigger potato as still within the grade.

The touchscreen 'drag and drop' feature allows users to decide, set and then clearly see which quality of potatoes goes to what sort exit.

Feedback about the potatoes from the sorter is provided with dashboard on-screen displays of product and machine data. Product data includes size and defect profiles of the product sorted. The data sets are available for SCADA or transfer to the plant servers for analysis and traceability.

**TOMRA Sorting Solutions Pty Ltd**  
[www.tomra.com](http://www.tomra.com)



## Water leak detector

Dwyer Instruments has released its Series WD3 Water Leak Detector. The device detects the presence of water in drip pans and air handler units, under raised floors or on floors around sump pumps and drains. Water is detected once it reaches a level that bridges the two conductive strips on the bottom of the housing. Audible and/or visual alerts provide local indication of the alarm condition and an internal switch will give remote indication or control to prevent further build-up of water.

Either AC or DC supply voltages can be used to power the detector, or in applications where power is not available, there is a battery-powered model. The sensing height can be adjusted to as low as 0.79 mm using the adjustable mounting bracket.

**Dwyer Instruments (Aust) Pty Ltd**  
[www.dwyer-inst.com.au](http://www.dwyer-inst.com.au)



## Tank cleaning nozzle heads

Spray Nozzle Engineering has developed the M-Series range of tank cleaning nozzle heads.

The self-cleaning features of the nozzles are claimed to ensure reliable operation and superior hydraulic water impact via channelled water jet streams in a true, 360° spray.

The nozzle, powered by the cleaning fluid, ensures an even, heavy, stream-like pattern. The hydraulic cleaning action operates throughout all pressure ranges, including low pressure applications.

The nozzle heads incorporate Gamajet machines, which deliver impingement force in a precise, repeatable and reliable pattern. This full-coverage indexing pattern ensures the entire tank or vessel interior is cleaned. According to the company, Gamajet machines are proven to reduce water and chemical usage up to 80%, reduce time spent cleaning up to 85% and completely eliminate hazardous confined space entry.

The range of rotary impingement tank-cleaning products adheres to FDA or 3-A ratings and is suitable for tank and vessel cleaning in the food and beverage processing industry.

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# Turning hogs into hot dogs

Jan Meerdink\*

**This article is the second in a trilogy about meat harvesting. The first, 'No time for waste: technical development in meat harvesting', discussed the state of the technology. This part describes the process itself with a focus on process optimisation, chain integration and an optimal balance between raw material, process and final product.**

**W**here relevant, the information will be linked to the megatrends in the food industry: demographics, scarcity of resources, health and healthy ageing, environment, sustainability and technology. The final part of the trilogy will discuss the advantages of an integrated view on the production process from a food technological perspective.

## Quality improvement

The introduction of the linear press meat harvester in the mid-1970s marked a revolution in meat processing. The relatively 'low-pressure' plunger allowed for a much higher quality residual meat than the then-widespread rotational press, which appeared to be more suitable for mass production and smaller, softer bone material, such as poultry. The linear technology also appeared less input-dependent and did not break the bones, thus leaving fewer occasional bone particles behind in the residual meat product.

For the first time in the production process of residual meat, a second path became available: that of quality pro-

duction. For the consumer, this resulted in mechanically separated meat with properties close to that of deboned meat.

Nevertheless, our thinking about residual meat remained traditional for a long time, where 'bones in, meat out' seemed to be the slogan. Differentiation regarding raw material and meat quality in the past was virtually non-existent. On the input side, all bones were being processed simultaneously, without any distinction whatsoever in terms of bone quality. On the output side, this resulted in a rather average, uniform meat quality, which, although much higher than rotational press meat quality, was still far from its optimal value.

## Tentative steps

It was not until the mid-1980s that a first, tentative shift in thinking of the meat industry took place towards differentiation and value upgrading of residual products. In the new millennium, the focus of the production process has turned to maximum output with consistently high meat quality levels. Even today, however, some opportunities re-





© PhotoEd/Dollar Photo Club

main unused. These opportunities could be taken advantage of with only a few changes in the approach of the meat-harvesting process.

Value upgrades for abattoir waste or by-products, such as bones, blood and pigs' legs, are mostly performed by specialised companies rather than being common practice in the meat-processing industry. However, this situation cannot be sustained for much longer: even today, megatrends like healthy ageing, sustainability and emerging scarcity of resources require a thorough knowledge of by-products within the entire production chain.

### **Diversification and flexibility**

Megatrends of the next decades will drive developments to diversify, capture and upgrade the value of by-products to great heights - and this will occur in the near future. Industry thinking will shift even further towards making full use of the animal and towards optimising product valorisation of all its parts. Likewise, the organisation of the production process cannot lag behind: our future lies in comprehensive diversification and extreme flexibility.

One existing diversification is achieved on the input end of the meat-harvesting process by classifying input bone material into either A-, B- or C-category bone for each animal type (pork, beef, lamb) according to the amount of residual meat present on the bone after deboning. If these different

quality streams are separated during the production process, producers can offer tailored quality, volume and pricing.

Further optimisation of meat production can be achieved by specifying the final product and adapting the other process variables such as press time and pressure. Here, it is important to adjust the type of bone to the desired meat quality as well as to the final product in which the residual meat will be processed.

Unfortunately, the option of separating bones according to quality is not yet used by all residual meat producers, leading to suboptimal value creation. Selecting the correct bone quality (A/B/C) on the input side may, for example, prevent the use of 'remedial' additives to combat quality defects at a later stage of the production process. A highly competitive global food market, in which scarcity of raw materials and resources will play an increasingly large role, will force producers of MSM (mechanically separated meat) to be highly rational and calculating about the input available to them from the very first steps of the process.

On the output end of the process, added value can be created from the by-products, provided they are no longer regarded and treated as waste products. In particular, bones can be upgraded after meat separation since they are a valuable source of marrow, collagen and phosphates for the medical, pharmaceutical and feed industries. Emerging global phosphate shortages in the near future may make phosphate extraction more than just an economic opportunity; it will become a moral obligation as well.

Besides diversification on both the input and the output end of the production chain, there is also a growing need for flexibility in the production process. While many producers today still opt for a model of uniformity and mass production (such as for export), production to customer specifications will gain ground in the future. Thus, producers of residual meat will no longer get away with offering only one, uniform quality to an almost unchanging customer base.

Another form of flexibility is driven by the globalisation of the meat and raw materials markets. To survive and flourish in a globalised market, producers of residual meat will have to produce more market-specific product, carefully taking into account volatilities such as daily prices and demand volumes. This then requires in-depth and high-quality knowledge in the fields of market analysis, technology and optimisation - knowledge that needs to be available on a daily basis.

### **Chain integration**

The current lack of knowledge and attention on the part of many residual meat producers and the existing decoupling between the links in the chain may be an impediment to radical diversification and flexibility. To many meat producers, producing residual meat is not a core activity, leading to broken links with the final product in some cases. The future, however, is in full chain integration, for a number of pressing reasons.

First, chain integration promotes economies of scale which are simply unattainable to scattered, individual producers.

*First of all, yield per animal (in this instance, pork) can increase by as much as 4% through the use of modern process technology.*


Fine-tuning between the links in the chain will lead to major savings. Moreover, meat might currently be subject to no less than nine transfers from slaughterhouse to shop, with only four steps necessary for optimal value creation. Companies integrating separate parts of the chain thus realise huge, necessary savings in process costs, transportation costs and refrigeration costs, among others.

Besides enabling substantial savings, chain integration has the potential to be the answer to society's loud call for sustainability. First of all, yield per animal (in this instance, pork) can increase by as much as 4% through the use of modern process technology. This brings the industry one step closer to fulfilling its moral duty to feed the population and make optimal use of resources. Moreover, once the production process from hog to hot dog includes fewer steps, the result will be lower transportation costs and thus fewer

additives in the product - yet another vital contribution to overall sustainability.

For the very same reasons, chain integration is beneficial for public health: meat passing faster through fewer hands is safer meat. Thus, chain integration may play a large part in reducing the risk of future food crises. Since healthy and safe meat is the market demand for the future, chain integration and full traceability of every step in the production process should go hand in hand.

### Conclusion

Thanks to the rationality of the market, the globalisation of trade and the increasingly heavy moral duty of sustainability, our industry is rapidly embracing the values of the old-fashioned, home-slaughtering farmer: hard work and frugality come naturally, there is no such thing as waste and in-house equals in control. Not much has changed really, except for the scale: we are now feeding the world. The potential is abundant, provided we start thinking in terms of sustainable chains spanning the entire production process, all the way from hog to hot dog. 

*\*Jan Meerdink is a specialist in meat harvesting and deboning with Marel.*

Marel  
[www.marel.com](http://www.marel.com)

## 'Smooth as silk' filling machine for Tofutown

Originally a small 'hippie collective' called Soyastern that formed in 1981, Tofutown has now become one of Europe's leading producers of meat and dairy alternatives manufactured from plant sources.

The company uses filling technology from SIG Combibloc and uses a CFA 310 filling machine for its range of soy and rice drinks which are filled into the combiblocSlimline aseptic carton pack.

"In a single sentence, our business model is: We make foods that people like eating and drinking, without resorting to the use of animal products. We use organic raw materials such as wheat, soy beans and organic vegetables," said company founder Bernd Drosihn, who also runs the Tofumusic record label.

"Overall, at our three German factories in Wiesbaden (Vulkaneifel), Lüneburg and now also Neukirchen in North Hesse, we make more than 110 vegetarian products - around 35% of which are exported."

Tofutown products are available throughout North America and Australia, plus some parts of Asia and the Middle East. The product portfolio includes vegetarian sausages and burgers, tofu products, sandwich spreads, vegetarian lards and cheese, soy and rice drinks and pasta sauces.

In 2004, the company developed the world's first whippable organic soy cream. Its cream products - as well as its rice and soy drinks - are sold in carton packs.



Tofutown initially used a co-packer to have its products filled in SIG Combibloc carton packs. Eventually, though, Drosihn decided that the company should invest in its own SIG Combibloc filling machine.

"We've been won over by the efficiency and flexibility of the machine. The individual processes are perfectly coordinated with one another. It runs like a toy on a slot car track - smooth as silk!" said Drosihn.

Visy Industries  
[www.visy.com.au](http://www.visy.com.au)



## Ultra-slim stainless steel waterproof panel PC



The Apex APC-3582T stainless steel fanless panel PC is sealed to IP65 specifications on five sides. The device combines an Intel Atom D525 1.8 GHz PC and a 15" 400 cd/m<sup>2</sup> TFT LCD in a thin enclosure measuring 399(W) x 324(H) x 67(D) mm.

The product supports up to 2 GB of 800 MHz DDR3 SO-DIMM memory, an internal 2.5" hard drive bay and both internal and external Compact Flash slots for optional storage. The 15" LCD provides a maximum resolution of 1024 x 768 pixels and includes a sealed resistive touch screen. The external I/O is mounted behind a protective splash panel and includes 4x USB 2.0 ports, 2x COM ports, 2x RJ45 LAN ports, a 7-pin I/O connector that includes external power switch contacts and a DC power terminal block.

The PC is designed to operate in temperatures ranging from 0 - 50°C. Its wide range DC input (11 - 32 VDC) allows the device to be powered from almost any DC source. The product provides a long-term reliable and quiet computing solution for industrial, food processing, medical and marine environments. Models with 12 or 17" LCD screens are also available.

**Interworld Electronics and Computer Industries**  
[www.ieci.com.au](http://www.ieci.com.au)



## Metal detector

The CEIA MS-21 Multi-Spectrum metal detector can be used to eliminate the waste and delay of false rejects caused by product effect while maintaining high sensitivity to all metal contaminants.

Using multispectrum technology, the CEIA MS-21 is claimed to outperform multifrequency metal detectors for inspection of high product effect foods such as fresh meats, cheese, frozen and non-homogeneous foods. Product effect occurs when conductive elements in foods (such as moisture, salt or iron) alter the electromagnetic field of a metal detector. This simulates the presence of metal when none exists, triggering a false reject of perfectly saleable product.

CEIA's Multi-Spectrum technology differentiates between metal contaminants and product effect conditions, something multifrequency detectors have difficulty doing reliably.

The MS-21 continuously tests and readjusts its detection characteristics to ensure maximum stability and performance.

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## Beamex PG pressure generators

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## Hygienic plastic modular belts

Habasit HyCLEAN plastic modular belts have been developed to improve hygiene conditions and cleaning procedures in food processing areas. The package includes a new sprocket and a 50.8 mm flat top module, with a hygienic design. The system also includes a CIP (cleaning in place) system that enables faster and more reliable cleaning cycles, substantially less water use and lower labour costs.

The products feature hygienic design, which complies with EHEDG hygienic design criteria, 100% hinge accessibility, 85% rod access, thorough cleaning of the belt and sprockets and good performance with low water-pressure.

The HabasitLINK M5065 Flat Top 2" HyCLEAN comes in standard belt widths in increments of 3" (76.2 mm). Non-standard widths are offered in increments of 1.5" (38.1 mm). The smallest possible width is 6.0" (152.4 mm).

The nominal tensile strength is valid for 23°C (73°F). The admissible tensile force depends on the operating temperature near the drive sprockets. Within the temperature range allowed, the admissible tensile force may vary from 100% to 20% of the nominal tensile strength.

Features include: 0% open area; solid plate; extra wide dynamic open hinge (6" link pitch); smart fit rod retention; food approved materials available.

**Habasit Australia and New Zealand**

[www.habasit.com.au](http://www.habasit.com.au)

## Vacuum sausage fillers

CBS Foodtech has available Rex Fillers for automated sausage production.

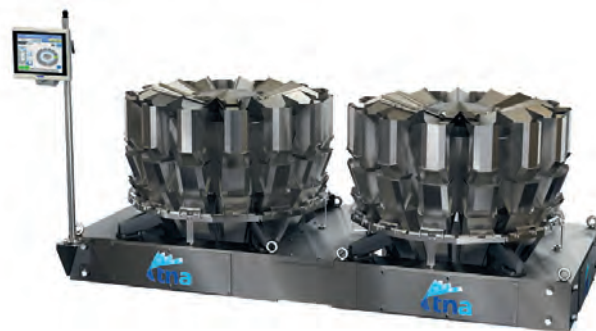
The fillers are available in a range of sizes to handle from small to large batches and either natural or artificial casing. The equipment completes filling, portioning and linking of sausages and can also perform portioning of rissoles and cevapcici.

The filler has an integrated vacuum system and is fully programmable for operator ease.

Attachments are available, including a clipper, cevapi cutter and attachments for hamburger patties and meat balls.

**CBS Foodtech**

[www.cbsfoodtech.com.au](http://www.cbsfoodtech.com.au)



## Multihead twin scale

The tna intelli-weigh 0328 omega multihead twin scale can be used in conjunction with either the tna robag or twin-configuration robag to weigh and bag a variety of food applications.

Based on multihead technology, the scale features ultrahigh speeds on a 3 L-capacity weigher, auto-tuning function for easy operation and optimum control, and an inspection wizard that highlights periodic preventive maintenance routines. Individually adjustable collating chutes allow for high-speed discharge, flexibility and enhanced product diversity, making it suitable for large production lines and complicated application mixtures.

The scale is capable of taking on 200 weighs/scale and up to 400 weighs/twin scale, depending on the application. According to the company, its high accuracy minimises product waste, improves yield and reduces power consumption by as much as 60% compared to conventional models.

Incorporating a 12.1" colour touchscreen monitor and self-explanatory user interface, the scale comes with easily removable parts to facilitate maintenance, a polygon bucket shape that assists cleaning and a complete stainless steel design (IP76).

**TNA Australia Pty Ltd**

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## Enhanced application for virtualisation environment

Emerson Process Management has released the DeltaV Virtual Studio v2.3, which expands the virtualisation capabilities in the DeltaV distributed control system (DCS) for easy implementation and management of online production and offline development, test and training systems.

Designed specifically for process control systems, with a workflow and feature set that is familiar to automation engineers, the studio's prebuilt virtual machine templates enable easy virtual machine creation without software installation. Every virtual machine created comes with all standard DeltaV system operating settings and network connections predefined to ensure consistent, error-free configuration and implementation.

The release also includes enhanced high availability and disaster recovery options. Various architecture and hardware solutions let facility managers pick the level of availability their system needs in response to any disruptive event. Also added is the ability to live migrate critical applications from affected hardware to minimise downtime during system maintenance or hardware upgrades.

**Emerson Process Management**

[www.emersonprocess.com.au](http://www.emersonprocess.com.au)

## In-kitchen seasoning systems

In-kitchen seasoning systems from Heat and Control evenly apply salt and seasoning to snacks, baked goods and other foods as they leave the processing and cooking equipment.

Fully adjustable and easy to clean, the over-the-conveyor and tumble drum applicators are available in various designs, including a belt-type flavour dispenser, pneumatic salter, oil salter and Greer economy seasoning applicator.

**Heat and Control Pty Ltd**

[www.heatandcontrol.com](http://www.heatandcontrol.com)

## Digital-asset sharing system



GS1 Australia's SmartMedia service is a multisector solution for managing and sharing up-to-date and authenticated images, multimedia files and other product-related digital assets and data with trading partners.

To support demand of photography for the management of digital assets, GS1 Australia has also enhanced its GS1 Photography Service to include 3D and 360° photography options and label data collection.

**GS1 Australia**

[www.gs1au.org](http://www.gs1au.org)

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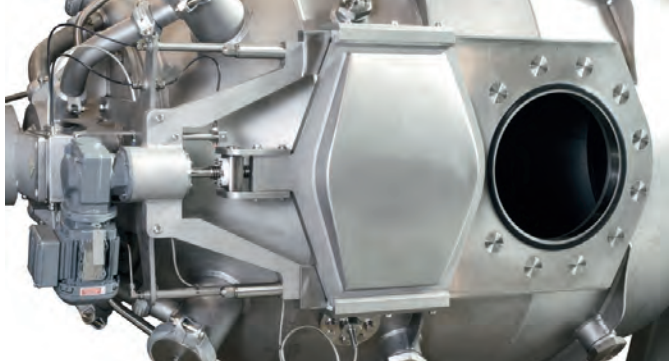
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## Rotary cereal cookers upgraded

A slide valve has been developed for Baker Perkins Cook Master cereal cookers to improve performance and hygiene, reduce maintenance and enhance safety. It is available as an upgrade to existing cookers and fitted as standard to new machines.

The air-assisted floating seal arrangement provides a secure barrier against steam leakage, ensuring pressure in the vessel is maintained during cooking. The seal also wipes the underside of the valve clean as it retracts, ensuring continual steam-tight operation to minimise energy cost and maximise hygiene and safety.

Product contact areas on the slide valve have been reduced and operator access improved for easier cleaning, up to allergen standards if required. The seal can be changed by a single operator without the use of tools in less than 15 min.

The upgraded cooker also features an enhanced control system including a sensor mounted on the cooker shell that measures pressure directly in the cooker rather than in the connecting pipework. This ensures that the valve can never be opened while the cooker is pressurised.

**Baker Perkins**

[www.bakerperkins.com](http://www.bakerperkins.com)

## Condition monitoring system

The VSE product range from ifm efector provides a combination of condition monitoring, machine protection and process monitoring.

Accelerometers can be connected with IEPE interface as well as the range of MEMS-based VSA vibration sensors to all four dynamic channels. Common accelerometers, microphones or force sensors which are based on the IEPE standard can also be connected. The improved history function enables the user to record over 600,000 time-stamped values. This makes it possible to accurately record over a considerably longer period of time.

A range of filters for real-time indicators are available for process monitoring. It is possible to select preset, eg, high- or low-frequency bands. A combination of filters is also possible. Up to 32 counters supply characteristic values, performance and runtime information. The short reaction time of <1 ms and variable alarm limits can be used to optimise production and machine protection. The gateway via OPC enables integration into higher systems and further transparency.

**ifm efector pty ltd**

[www.ifmefector.com](http://www.ifmefector.com)



## Air/gas flow meter for industrial ovens and furnaces

The ST75 Air/Gas Flow Meter from Fluid Components International (FCI) measures fuel gas, process gas, inert gas, waste gases and air in small line sizes. It is suitable for optimising natural gas flow control for industrial ovens, heat chambers and furnaces to reduce process and plant fuel costs.

The meter is suitable for low-flow and high-flow operations in industrial ovens and operates over a wide flow range, from 0.01 to 950 NCMH depending on line size. For variable process conditions, the meter is factory preset to a turndown range of 10:1 to 100:1.

With built-in temperature compensation, the meter maintains consistent performance in rugged, hot industrial process environments. It features accuracy to  $\pm 2\%$  of reading with  $\pm 0.5\%$  repeatability over varying process temperatures in line sizes from 6 to 51 mm.

The meter's precision flow element has a no-moving parts design that employs platinum RTD sensors embedded in equal mass thermowells with microprocessor electronics calibrated to laboratory standards for a wide range of gases.

The meter features remote-mounting capabilities for hazardous or crowded plant environments. The remote-mount transmitter can be mounted up to 15 m away from its thermal mass flow sensor in the process piping.

The fully scalable dual 4-20 mA standard outputs are user assignable to flow rate and/or temperature and a 0-1 kHz pulse output of total flow. The instrument can be ordered for input power with either 18 to 36 VDC or 85 to 265 VAC.

The device is enclosed in an all-metal, dust- and water-resistant NEMA Type 4X (IP66) rated package designed for hazardous area installations.

**AMS Instrumentation & Calibration Pty Ltd**

[www.ams-ic.com.au](http://www.ams-ic.com.au)





## Colour-coded hygiene tools

Vikan has upgraded the Edge range of colour-coded hygiene tools, available from Wells Hygiene. Available in nine colours, the cleaning tools are shaped to have no negative angles. This means that water will not pool or dwell on the product, reducing the risk of bacteria growing.

The company used 3D print technology in the production of some of the tools, which have been designed to be easy to clean, hold and use.

**WR&D Wells Pty Ltd**  
[www.wrdwells.com](http://www.wrdwells.com)

## Food-safe cleaning wipes

LIVI food-safe wipes are made from a soft, non-woven viscose mix that is strong and absorbent and is colour coded for use in a range of areas - blue for general purpose, green for commercial kitchens and food preparation areas, yellow for infection control and red for washroom areas.

The re-usable wipes are made from 70 gsm cloth which is apertured for quick pick-up of dirt and spills. Each roll is 45 m long and contains 90 perforated sheets.

**Solaris Paper**  
[www.solarispaper.com.au](http://www.solarispaper.com.au)



## FDA-approved silicone sponge

Silicone Engineering has developed kSil, a fully FDA-approved, food-grade silicone sponge.

The sponge is suitable for seals and gaskets and can withstand temperature variations from -60 to 230°C. It is available in rolls, sheets and extrusions (cords, tubing, profiles and sections).

**Silicone Engineering**  
<http://silicone.co.uk>



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# Keeping computing systems in food plants clean

Computers in food plants have to be cleanable so they don't add any contamination load to the end products. So they must be able to withstand the cleaning and sanitation regimes of the plant.

**T**he food industry relies heavily on computer-based control systems and human-machine interfaces (HMIs) to automate and control manufacturing and other processes and also to communicate with human operators. These computers are frequently out in the plant itself and so must be able to withstand the food plant environment and be able to be kept clean so they do not contribute any contamination potential to the foods or beverages.

This means that the equipment will be periodically subjected to high-pressure washdown and exposed to cleaning and sanitising solutions to protect against biological contamination of the end product.



## Sealed computer or sealed enclosure?

The deployment of computer equipment in such washdown environments presents a particular set of options and trade-offs to the system designer. One key issue is whether to specify a sealed, industrially hardened computer that's ready to deploy in a washdown environment or to specify an appropriately sealed industrial enclosure into which a more general-purpose computer can be placed. Either approach can perform admirably when it comes to the basics of routine operation: meeting the process's sanitation requirements while protecting electronic equipment from water sprays and temperature extremes. Over the long term, however, the choice between the two is an investment decision that must balance life cycle costs, operational continuity and the accelerating pace of information technology.

## Equipment protection in industrial environments

The IP (International Protection Code and Ingress Protection Code) rating for equipment or enclosures gives a quantifiable measure of protection against intrusion by either solids or liquids.

The IP Code, specified in Australian Standards AS60529 and also EN60529 and IEC 60529, consists of two numbers and an optional letter, eg, IP67. The larger each digit, the greater the protection.

The first digit represents the level of protection against solid objects. It ranges from 0, which means no protection, through protection against large objects such as hands (1) to total protection against dust ingress (6).

The second digit in the code represents protection against liquid ingress. Once again, 0 implies no protection. Numbers 1 to 6 give increasing protection from falling drops of water through sprays up to high-pressure water jets.

A rating of 6 will cover you for ratings 1 to 5 for both solid and liquid protection.

Liquid protection ratings of 7 and 8, however, are separate. These digits give a measure of protection against immersion but do not imply spray protection as well.

There may be additional letters after the two digits. These letters can be appended to classify the level of protection against access to hazardous parts by humans. For example: A - back of the hand, B - finger etc.

Further information can be appended that relates to the protection of the device: H - high-voltage device, M - device moving during water test etc.

The standard does not specify standards of protection against risks of explosions or conditions such as moisture (produced, for example, by condensation), corrosive vapours, fungus or vermin.

## IP69K and the food processing industry

The IP Code does not cover enclosures that are subjected to high-temperature and high-pressure washdowns such as those found in the food industry. The Germans issued standard DIN 40050-9, which extends the IEC 60529 rating system with the IP69K rating. Initially developed for road vehicles, especially those like cement mixers that need intensive cleaning, IP69K is particularly useful in the food industry.

The IP69K test involves close range, low volume and very high pressure - similar to that experienced in the food and beverage industry.



*The IP (International Protection Code and Ingress Protection Code) rating for equipment or enclosures gives a quantifiable measure of protection against intrusion by either solids or liquids.*



Products rated to IP69K must be able to withstand high-pressure and steam cleaning. The test specifies a spray nozzle that is fed with 80°C water at 80-100 bar and a flow rate of 14-16 L/min. The nozzle is held 10-15 cm from the tested device at angles of 0°, 30°, 60° and 90° for 30 seconds each while the test device sits on a turntable that rotates once every 12 seconds.

Possibly the best advice is to buy a copy of the standard, decide what level of protection you, your equipment and enclosures need and then purchase equipment with the appropriate IP rating.

The National Electrical Manufacturers Association (NEMA) has also developed classifications to make it possible to specify enclosure requirements. While similar to the IP rating the two methodologies are not directly interchangeable. The NEMA enclosure classification of specific relevance to washdown environments is 4X. The operative descriptors for NEMA 4X are protection against hose-directed water and resistance to corrosion. Corrosion resistance normally dictates stainless steel construction.

NSF International has also codified the essential characteristics of enclosures used in washdown environments in its NSF/ANSI (American National Standards Institute) standard 169 covering 'Special Purpose Food Equipment and Devices'.

Essential aspects relevant to the enclosure's ability to be thoroughly cleaned (and not harbour microbial contaminants) include lift-off hinges with removable pins; leg stands or easily cleaned casters with a minimum 150 mm unobstructed clearance; sloped surfaces to facilitate runoff; welded and deburred joints and seams; easily cleanable fasteners, including slot-head quarter-turn latches; and no exposed threads, projecting screws or studs.

Adequate thermal management is another fundamental design consideration - whether a sealed industrial computer assembly is used or whether the enclosure and computer are specified separately. After water, excessive heat in particular is a computer's worst enemy. Some sealed industrial computers are designed to work without active cooling; this is intended to improve system reliability because no moving parts are involved, but may limit the unit's ability to dissipate heat at higher ambient temperatures. Other industrial computer assemblies employ the same cooling technologies as stand-alone enclosures, including fans and heat exchangers, air conditioners and vortex coolers. Heaters, too, sometimes are dictated in order to deal with refrigerated processes and to avoid condensation within the enclosure.

## What happens when the computer fails?

From a design and nominal performance perspective, there's generally little to differentiate an industrial IP66 computer from a general-purpose computer in a separately specified IP66 enclosure. In general, the higher initial purchase price of the industrial computer will offset the costs of a less expensive,


IP (1st digit)	Protection of equipment against solid objects	Tested by	Meaning for protection of persons	IP (2nd digit)	Protection against water with harmful effects	Tested by	Meaning for protection from water
0	No protection	None	No protection	0	No protection	None	None
1	Solid objects 50 mm	50 mm dia. sphere applied with 50 N force.	Accidental touch by back of hand	1	Vertically dripping	Drip box for 10 min.	Falling drops of water, condensation
2	Solid objects 12.5 mm	12.5 mm dia. sphere applied with 30 N force.	Accidental touch by fingers	2	Dripping - 15° tilted	Drip box, 2.5 min. per side	Direct light streams of water, up to 15° from the vertical
3	Solid objects 2.5 mm	2.5 mm dia. steel rod applied with 3 N force.	Accidental touch by tool	3	Spraying	Oscillating tube $\pm 60^\circ$ , 10 min., 10 L/min.	Direct sprays of water, up to 60° from the vertical
4	Solid objects 1 mm	1 mm dia. steel wire applied with 1 N force.	Accidental touch by small wire	4	Splashing	Oscillating tube $\pm 180^\circ$ , 10 min., 10 L/min.	Water sprayed from all directions, limited ingress
5	Dust-protected (limited ingress, no harmful deposit)	Dust chamber with or without under-pressure.	Accidental touch by small wire	5	Jetting	6.3 mm dia. nozzle from 2.5 to 3 m distance, 12.5 L/min. for 3 min.	Low-pressure water jets from all directions, limited ingress
6	Dust-tight (totally protected against dust)	Dust chamber with under-pressure.	Accidental touch by small wire	6	Powerful jetting	12.5 mm dia. nozzle from 2.5 to 3 m distance, 100 L/min. for 3 min.	Strong jets of water, limited ingress
				7	Temporary immersion	Immersed in tank with water 0.15 m above top and 1 m above bottom, for 30 min.	Protected against the effects of temporary immersion in water.
				8	Continuous immersion	Water level and time as specified by manufacturer.	Protected against the effects of continuous immersion in water.

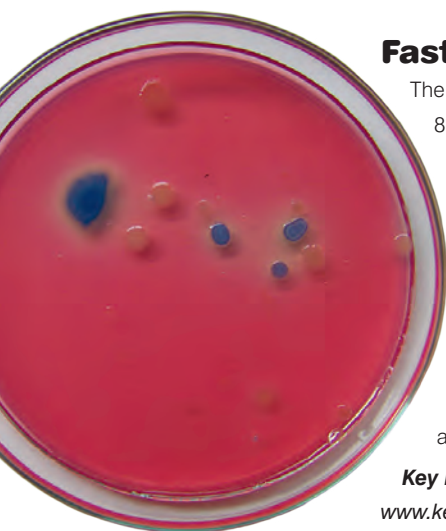
#### IP rating

general-purpose computer and enclosure. If specified properly, either option will capably perform the task at hand.

While an industrially hardened computer should last longer, hardware failures do happen and these computers are often relatively inflexible when it comes to repair, and their sealed design may require a visit from the supplier's service technician.

If, however, a non-industrial computer kept in an IP66-rated enclosure fails, repairs are usually simpler or a back-up computer more economically maintained in inventory.

Significantly in these days of fast technology improvements, by decoupling the protection element from the computer users can more simply and economically take advantage of advances in computing and software technology. 



### Fast hygiene and product microbial load testing

The MicroSnap platform bridges the time gap between ATP and bacterial culture results with convenient, 8-hour or less tests for *E. coli*, coliform, *Enterobacteriaceae*, and Total Viable Counts for both environmental swabs as well as product testing. Most of the range has either gained or has applied for AOAC approval.

MicroSnap tests are read by the EnSURE monitoring system and results are recorded with Sure-Trend software.

EnSURE measures both ATP monitoring and organisms tests, enabling food and beverage processors to acquire an accurate status of plant hygiene and product quality during the same working day or shift. Knowing test results sooner prevents recalls, reduces waste, shortens hold time and enables a quicker response when contamination issues arise.

The EnSURE system also can be used to get real-time hygiene results in only 15 s to allow immediate corrective action should a cleaning failure be detected.

**Key Diagnostics Pty Ltd**

[www.keydiagnostics.com.au](http://www.keydiagnostics.com.au)

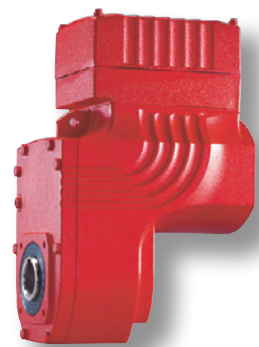




# Food For Thought

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# The emerging field of nutrigenomics

**Nutrigenomics is a relatively new field of research in which genetics and nutrition come together to optimise the efficacy of diets and how dietary consumption affects gene expression.**

**T**he science behind such tests is complex as it requires understanding the body's response to certain foods and eating regimes on the level of an individual's genes.

Nutrigenomics, which includes diet DNA testing, seeks to create a diet that is closely tailored to the needs of the individual; a healthy eating plan to which they are more likely to respond positively. Nutrigenomics will aid to distinguish those people who will react positively on one type of diet and those who will achieve poor results or no results.

## The dieting challenge

Have you ever wondered why people on the same diet achieve such different results? When undertaking a study that is to have reliability and validity, scientists grouped participants into groups; age, gender and any pre-existing medical conditions were taken into consideration and people grouped according to certain criteria and demographics.

When the first studies were carried out, spurred by these different results achieved between people on the same diet, scientists could only turn their glance towards genetics as the most likely culprit. They have, in fact, proved that our genes play a vital role in how much weight we lose or even whether we lose any weight in the first place.

## Some examples

One of the main areas of many studies within the field of nutrigenomics is cancer. The shift is now towards this potentially lucrative market (if ever a cure is discovered). Pharmaceutical companies have, for example, been focusing far less on other more costly and less lucrative drug development projects - most research for new antibiotics has come to a standstill as the mutation rate of bacteria vis-à-vis the 10-year patent pharmaceutical companies have on new drugs

developed have made this area unprofitable in light of other treatments for other diseases.

## Red meat and cancer

One of the highly contended foods is red meat - just how healthy or unhealthy is this food and how does it antagonise our genes? The American Institute for Cancer Research (AICR) has linked cancer of the colon and rectum to red meat consumption, showing that consumption is directly proportional to risk; people who consume 100 g of unprocessed meat per day had an elevated risk of 15-20% of developing these types of cancer. Processed meats posed even higher risks. But it is not only the meat itself that may affect our chances of developing cancer, it is also the way it is cooked. Meats cooked for longer periods of time and above 148°C are known to have higher levels of heterocyclic amines and mutagenic polycyclic aromatic hydrocarbons.

Certain fruits like tomatoes have been shown to reduce the risk of cancer; they contain lycopene in abundance. They have also found that apples contain a chemical that can fight Crohn's disease, a disease which targets the digestive lining causing anything from diarrhoea to malnutrition. Variations in absorption or excretion of phytochemicals influence the extent to which nutrients derived from plants impact the individual. Based on this genetic difference, people should consume specific fruits or vegetables depending on their genotype.

The future is promising. Further studies will further clarify and explain these complex interactions and augment response to dieting, improving health and wellbeing and reducing disease susceptibility.



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## Protein determination according to Dumas

In Vitro Technologies now has available Buchi's expanded product portfolio that includes Dumas technology. The company says it is the only provider of all three key technologies - Kjeldahl, Dumas and NIR.

The Buchi DuMaster D-480 analyser utilises the Dumas method, which is mainly used in the food, beverage, feed and agriculture industries for the determination of protein in food/feedstuffs or total nitrogen in fertilisers or soils.

Dumas technology can be applied to almost all Kjeldahl applications including: production and quality control in the food/beverage and feed industry; universities and research laboratories; private or public testing laboratories.

The DuMaster D-480 analyser is supplied ready to use including operating software and 60-position auto sampler. Unattended operation with random access allows samples to be loaded at any time.

The device features a reduced operational cost as the system uses CO<sub>2</sub> as carrier gas instead of helium, 95% less oxygen consumption and 3x higher reduction capacity of tungsten (as opposed to competitive Dumas instruments which use copper as reducing agent).

The unattended and fast operation lowers operating cost per sample.

Other key features include: short analysis time; an option to increase sample throughput up to 120 samples; highest sample throughput without supervision.

The device is safe and convenient, with samples able to be loaded at any time (random access vs batch processing); low-voltage furnace; suitable for flexible evaluation of samples.

There is no contact with harmful chemicals and the Dumas method is compliant with AOAC, ISO, DIN and other authorities.

**In Vitro Technologies Pty Ltd**  
[www.invitro.com.au](http://www.invitro.com.au)

## Biofilm detection spray

The presence of biofilms on surfaces within food and beverage processing areas is a serious potential cause of contamination of the final product. Biofilms can be caused by bacteria including *Listeria*, *Salmonella*, *E. coli* and *Staphylococcus*. Itram Higiene has developed BioFinder, a biofilm detection spray for the detection of biofilms in open surfaces.

The spray, available from Wells, reacts in the presence of biofilms so the user can visually identify if biofilm exists.

**WR&D Wells Pty Ltd**  
[www.wrdwells.com](http://www.wrdwells.com)

## Consistometer

Consistency of a sample is measured by its resistance to flow under specific conditions for a specified time. Arrow Scientific has available the Bostwick Consistometer, which is



suitable for measuring the consistency and flow rate for a wide range of viscous materials such as sauces, salad dressings, paints, chemicals and cosmetics.

The consistometer is manufactured

from stainless steel, making it suitable for heavy-duty use. The device complies with the procedures established in Mil Spec R-81294D and ASTM F1080-93. It is a long trough with 0.5 cm graduations along the bottom. The trough is separated near one end by a spring-loaded gate. This forms a chamber where the sample is loaded.

To perform a test using the consistometer, the operator pours the sample into the loading area of the trough. The sample is filled and levelled off to the top of the gate. The gate is then opened and the timer started concurrently. At a predetermined time, the position of the sample in the trough is recorded.

**Arrow Scientific**  
[www.arrowscientific.com.au](http://www.arrowscientific.com.au)



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## Same-day test for *Brettanomyces bruxellensis*

*Brettanomyces bruxellensis* (Brett) is a commonly occurring organism in the brewing and wine industries that can alter the taste and aroma of finished product.

Since Brett can cause varying degrees of spoilage of wine, it is important for winemakers to check for the presence of this organism in their wine and production environment throughout the process.

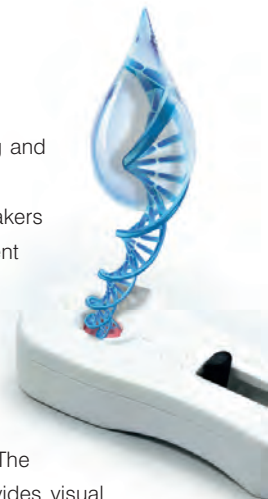
When caught early, there are various intervention methods available in order to prevent spoilage from occurring. However, until recently, Brett detection methods were relatively time consuming and/or unreliable.

The Invisible Sentinel Veriflow Brett system, available from Australasian Medical and Scientific Limited, provides results in 4 h, which allows same-day action to be taken. The system has a simplified sample preparation that minimises hands-on time and provides visual, easy-to-interpret results. This means users do not need highly specialised staff or equipment to perform the test on-site.

The technology allows for the sensitivity of real-time PCR tests, but with the ease of use associated with flow-based assays.

**Australasian Medical & Scientific Ltd**

[www.amsl.com.au](http://www.amsl.com.au)



## Food texture analyser

Bestech Australia has available the TA1 from Lloyd Instruments that is designed to evaluate the textural, mechanical and physical properties of a finished product or raw ingredients primarily used in the food industry.

Texture measurement and texture profile analysis are essential for quality improvement in the supply chain and efficiency enhancement of the production process. Texture is the characteristic physical structure given to a material or object, by the size, shape, arrangement and proportions of its parts or composition. It can be acknowledged and valued by the visual and tactile quality of the surface and described by how the surface, material or substance feels (rough, smooth, hard, soft, etc). For accurate measurement of the texture of an object, and to quantify the quality of its nature, a texture analyser is required.

The principle of a texture measurement system is to deform the sample in a controllable manner and measure its response. Similar to material testing machines, forces created during deformation of the testing sample (ie, food) jigs are manipulated to recreate conditions that foods are exposed to when being eaten or processed. In this way, texture is measured directly and its characteristic performance and 'feel' of the testing sample can be envisaged.

**Bestech Australia Pty Ltd**

[www.bestech.com.au](http://www.bestech.com.au)

## Yeast and mould count plates

3M Petrifilm Rapid Yeast and Mold Count Plates simplify and accelerate detection in product and environment testing. The sample-ready plates feature an indicator technology that makes colonies easier to interpret, returning results in 48 h.

The fast results enable users to reduce labour, inventory and storage space while enabling longer shelf life and faster service to customers.

NF Validation by AFNOR Certification (certificate reference n# 3M 01/13-07/14) has been granted to the plates. It has been validated for the enumeration of yeast and mould in all human food products, animal feeding stuffs (including pet food and animal breeding) and environmental samples.

**3M Australia Headquarters**

[www.3M.com/au](http://www.3M.com/au)





### Test platform for the detection of microbial contaminants

The BioLumix test platform, for the detection of microbial contaminants, includes an instrument where test vials are incubated and automatically read for results plus an automatic system to alert users to sample results. The basic unit accommodates 32 different test vials at a time and can be combined in modules to accommodate up to 1000 different samples simultaneously.

In many cases, the test platform, which is available from Cell Biosciences, provides answers during the same work shift, resulting in greater throughput, less inventory and optimum shelf life for perishable products.

**Cell Biosciences Pty Ltd**  
[www.cellbiosciences.com.au](http://www.cellbiosciences.com.au)

### Seal tester

The Espera Esli line inspection system is a seal tester for MAP gas flushed packs, available as an integrated inline or standalone system with an IP65 rating and speeds up to 150 packs/min. The product complements the Espera Vision System (ESVS) or can be operated as a standalone version.

The testing method is a three-step, non-destructive operation of measuring pack heights under a predefined pressure to check for variations. All packs detected with a leak are rejected from the line. All program parameters and values are easily set by the operator and stored under the package program. Additional features include auto-tune mode and auto-teaching mode for simplicity of set-up and operation.

The system is suitable for use with all types of consistently produced gas flushed packs, such as pre-made trays, thermoformed packs, flow wrapped packs, pillow packs and more. By automating the time-consuming manual aspects of QA checks, the tester enables users to better direct their QA resources and helps to prevent product returns recalls campaigns, ensuring that only fully sealed packs are packed into shipping cartons.

**Linco Food Systems**  
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# Increasing the life span of cheese

**Natural, edible coatings with an antimicrobial capacity have been found to increase the shelf life of soft cheeses.**

**R**esearchers at the Universitat Politècnica de València (UPV) have incorporated oregano and rosemary essential oils along with chitosan, a by-product that comes from crustacean shells, into a totally edible film which they claim increases the life span of soft cheese.

Chelo González, a researcher at the Institute of Food Engineering for Development of the UPV, explained that, "The most common causes of deterioration are excessive surface dehydration and the growth of microorganisms such as fungus or yeasts, which produce a strange flavour or odour, a slimy texture and a significant visual alteration."


Today, the most widely used method of avoiding fungal growth in cheese is the application of natamycin (or pimaricin) - a common antifungal polyene macrolide that binds specifically to ergosterol and blocks fungal growth - and a coating of polyvinyl acetate plastic. Currently the life span of commercial soft cheese treated with pimaricin is about 21 days in cold storage.

However, the edible coating developed by the UPV researchers now offers processors a natural alternative to the pimaricin and polyvinyl combination that is commonly used on commercial cheeses.

"The product that we have obtained is an alternative to the use of pimaricin and non-edible plastics. Moreover, using a natural and edible product reduces the fungal problems and controls the weight loss during the maturing," said González.

Another possible application for the antimicrobial film is in mature cheese where it can be used to decrease the growth of fungus on the surface of the cheese during the maturing process. If these cheeses have pressing faults or fissures the surface fungus can enter into the pieces and significantly reduce their value. "In this case, applying the coatings that we have developed will reduce the proportion of product losses in the cheese factories and therefore the important economic losses that this implies," explained González.

Of the oils used, the oregano oil was the most effective, inhibiting the fungal growth in a similar way to a conventional pimaricin treatment. Moreover, the researchers conducted a sensory study that enabled them to adjust the concentration of the essential oil in order to obtain formulations with antifungal activity together with good sensory acceptance. In fact, the more than 100 panellists that were used for the sensorial analysis gave higher scores for the cheese coated with essential oils, for taste and odour attributes, in comparison with the uncoated cheese.

Researchers at the Institute for Animal Science and Technology, led by Professor Pilar Molina, and at the Department of Agroforest Ecosystems of the UPV, led by Pilar Santamarina, have also participated in this project. The conclusions of this work were presented in the last edition of the Iberoamerican Congress in Food Engineering and they will be released shortly in the *International Journal of Food Studies*. 



## Test for Aflatoxins in bovine milk

Charm Sciences has released a test for the detection of Aflatoxins (M1) in bovine milk. These tests, available from Merck Millipore, allow dairy processors to screen milk to two levels of sensitivity, 50PPT and 500PPT, which will enable exportation into the Chinese market.

To complement the traditional ROSA platform testing previously offered, the same test can now be performed on the Charm EZ reader. This instrument offers a built-in incubator and reader in one unit. All data is stored on an SD card, which allows download capabilities as well as data transfer.

Obtaining a result is achieved by a 4-step process and the result is shown automatically on the screen. The Aflatoxin tests are run at two different temperatures and incubation times. Positive controls and dilution buffers are supplied with each kit.

**Merck Millipore**

[www.merckmillipore.com](http://www.merckmillipore.com)



## Milk proteins produce 'recombined' cheese without fresh milk

Arla Foods Ingredients has developed a range of 'recombining' solutions to enable dairy companies to produce specialty cheeses without fresh milk.

Recombined white, processed and cream cheeses can be produced using Nutrilac functional milk proteins, water and fat - usually butterfat or anhydrous milk fat (AMF). The solutions work on existing recombining machinery and generate no whey side stream, maximising output and reducing waste.

The company offers more than 20 flexible solutions with variable cost-in-use, capable of producing cheeses of different quality tiers.

**Arla Foods Ingredients**

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**60**  
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# New options on the horizon for children with cow's milk allergy

There are currently no approved treatments for children with milk allergies except avoidance, but that may be going to change. The clinical-stage specialty biopharmaceutical company DBV Technologies has begun enrolling cow's milk-allergic subjects in a Phase I/II clinical study to evaluate the safety and efficacy of Viaskin Milk, an epicutaneous patch for the treatment of children with IgE-mediated cow's milk allergy (CMA).


CMA is the first allergy to appear during early childhood and the most common food allergy in infants and young children, affecting 2 to 3% of the general population. CMA is often missed in the primary care setting and can be a significant cause of infant distress when left undiagnosed. Symptoms can include gastrointestinal problems including vomiting and diarrhoea, skin rash, angioedema or rapid swelling of the skin, and anaphylaxis. The only option available for CMA management is the avoidance of cow's milk, which can lead to issues of dietary imbalance, failure to thrive and poor quality of life.

The Viaskin MILK Efficacy and Safety Phase I/II study, or MILES study, is a multicentre, double-blind, placebo-controlled, randomised study designed to evaluate the safety and efficacy of Viaskin Milk used to treat subjects on a daily basis by Epicutaneous Immunotherapy (EPIT). Eligible subjects are those with elevated cow's milk-specific Immunoglobulin E levels and who show clear objective signs or symptoms to an eliciting dose of cow's milk proteins  $\leq 300$  mg (approximately 9.4 mL of cow's milk).

DBV Technologies has developed a worldwide-patented technology for administering an allergen to intact skin while avoiding transfer to the blood, thus considerably lowering the

risk of a systemic, allergic reaction in the event of accidental exposure. DBV Technologies is focusing on food allergies, including milk and peanut, for which there are currently no effective treatments.

The MILES study is composed of two parts. Part A, or Phase I, will evaluate the safety of three escalating doses of Viaskin Milk (150, 300 and 500  $\mu$ g cow's milk protein) versus placebo over three weeks. Part B, or Phase II, will evaluate the efficacy and safety of up to 12 months of EPIT with two selected doses of Viaskin Milk from Part A. Approximately 150 subjects (18 subjects in Part A and 132 subjects in Part B) from 2 to 17 years of age will be randomised in the study, at selected North American sites, specialised in the management of food allergic subjects.

The primary efficacy endpoint is the percentage of treatment responders after 12 months of EPIT. Responders are subjects who meet one of the following criteria: a  $\geq 10$ -fold increase in the cumulative reactive dose (CRD) of cow's milk proteins at the Month 12 food challenge as compared to the baseline value and reaching at least 144 mg of cow's milk proteins (approximately 4.5 mL of milk); or a CRD of cow's milk proteins  $\geq 1444$  mg (approximately 45 mL of milk) at the Month 12 food challenge. 



## Pumping up cheddar production

Glanbia Nutritionals is the largest manufacturer of milk products in Ireland. A fully automated cheddaring plant with seven cheese towers was installed at the company's Ballyragget production facility in 2011.

After pasteurisation and the addition of rennet, the curd is cheddared by passing through a sealed system, which separates the whey and adds salt to the remaining curd. The resulting 'prepared curd' is transported by vacuum conveying lines to the cheese towers, where it is shaped into blocks.

Previously, conventional rotary lobe vacuum pumps were used to transport the curd and compress it into blocks. This vacuum system had the disadvantage that it could only pump down to 500 mbar. The pumps were equipped with frequency-controlled motors, but the vacuum level could not be improved by increasing the speed due to technical limitations. The installation used a total of nine of these pumps, each requiring 15 kW.

The decision was taken to replace the existing pumps with Busch Mink claw vacuum pumps.

Depending on size, Mink claw vacuum pumps reach a vacuum of between 100 and 200 mbar, which is significantly higher than the level achieved by rotary lobe vacuum pumps. The average working vacuum at the Glanbia site is between 300 and 350 mbar, giving Mink claw vacuum pumps ample reserve to cover demand spikes. The pump motors have individual frequency control, enabling the vacuum level to be adjusted to suit the process.



The vacuum in the cheese towers is controlled precisely, maintaining constant curd density and thus improving product quality. Consistent product quality has also helped precision at the packing station, as the variation in cheese block weights has reduced.

Mink claw vacuum pumps also consume less power: the new pumps require only 9 kW each running at 50 Hz. Glanbia has calculated the annual savings in power costs to total €27,557.

Since the installation of the vacuum pumps in January 2014, no service interruptions or technical problems have been observed. This is partly attributed to the dry and contact-free working principle of the claw vacuum pumps, as they require no working fluids for compression, and the internal moving parts do not make contact with each other. In addition, the noise level is considerably lower than with the previously installed pumps.

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## Dairy exports to China set to grow

Australian dairy producers and manufacturers will benefit from tariff reductions for liquid milk thanks to the China-Australia Free Trade Agreement (FTA), according to Agriculture Minister Barnaby Joyce.

Norco's \$4.5 million upgrade to its dairy processing facilities is a reflection of increased business confidence among Australian agricultural companies, Minister Joyce said.

"Norco should be congratulated for their success to date both in Australia and overseas. Having pioneered a cold supply chain to facilitate exports of fresh milk into China, Norco is well placed to take advantage of any further improved market access into China and is now investing \$4.5 million to upgrade its Raleigh dairy processing facility in readiness to meet increased demand from this key trading partner," said Minister Joyce.

"This investment will translate into higher production and more demand for quality milk from Norco's suppliers and I have no doubt will lead to better farm gate returns over the long term.

"In fact, in a major win for the company, Norco has recently had an order to supply an additional 90,000 litres of milk over three months to China. Norco's commitment to being a reliable supplier of high-quality milk and milk products to China as well as its commitment to back itself should also be congratulated.

"Of course, improving our capacity to provide high-quality Australian milk will not meet all of the demand that China or Asia will have into the future - but through companies like Norco, we can contribute to the food needs of the region."

## Dairy products and type 2 diabetes risk

In a recent Harvard School of Public Health (HSPH) study, researchers found that higher consumption of yoghurt was associated with a reduced risk of type 2 diabetes while other dairy products did not offer similar protection.

Drawing on health data from more than 100,000 participants in three long-running studies - the Health Professionals Follow-Up Study (1986 to 2010), Nurses' Health Study (1980 to 2010) and Nurses' Health Study II (1991 to 2009) - the researchers found that a daily serving of yoghurt was linked to an 18% lower risk of type 2 diabetes.

Senior author Frank Hu, professor of nutrition and epidemiology, told Forbes that the mechanisms behind this finding "are not well understood at this point. One hypothesis is that the probiotics in yoghurt may help to improve insulin sensitivity and reduce inflammation, but this hypothesis needs to be tested in randomised clinical trials."

The study's lead author was doctoral student Mu Chen.



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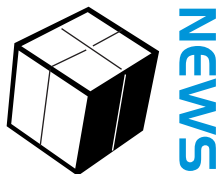


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# packaging





## Demand for antibacterial packaging grows

What do UK consumers want most in their cans? Antibacterial packaging. More than half of all British consumers are more concerned about bacteria on the outside of a can than the presence of dirt and dust. Bacteria concerns even trump worries about dented or discoloured cans, new research from Canadean shows.

In total, 55% of British consumers surveyed said they were “concerned” or “very concerned” about germs on the outside of cans. Younger consumers are less concerned about bacteria, with just 49% saying it’s an issue, while those aged 55+ are most concerned about it (63%).

Unexpectedly, male consumers were slightly more concerned about bacteria than female consumers (57% vs 53% respectively).

“Consumers are becoming more conscious about the distribution and storage of grocery products and the implications this has on the safety and quality of food. As such, there is a clear demand for products that have antibacterial packaging to help reassure consumers,” said Michael Hughes, lead analyst at Canadean.

“This will be particularly true with products that are purchased on the go and from retailers that consumers are unfamiliar with and where they are less confident about the safety and quality of products.

“Given that older consumers are most worried about the presence of bacteria, which can be linked to a greater level of concern about immunity and maintaining health, the demand for antibacterial packaging will only intensify in the future as society continues to age.”



© Pavel Losevsky/Dollar Photo Club

## Date announced for 2015 APPMA Industry Excellence Awards



Eagerly awaiting the 2015 APPMA Industry Excellence Awards? Never fear - the Australian Packaging and Processing Machinery Association (APPMA) has announced the date for the awards.

The winners will be announced on 25 March at the Crown Melbourne. Submissions are now open for the awards.

“Companies that enter these biennial awards are recognised for their contribution and outstanding achievements against their peers within the wider packaging industry and we encourage everyone to enter,” said Mark Dingley, Chairman, APPMA.

The awards categories are:

### 2015 Export Achievement Award

This award recognises worthwhile contributions to an existing or new export market. Contributions can include establishing a new market, achieving a significant increase in sales by both supplier and customer, identifiable by monetary gain from an export activity. It can also be any developed packaging or processing machinery sold into overseas markets which contributes to improved business outcomes, efficiency, sales and profit increases.

### 2015 Design Achievement Award

This award recognises the development of a packaging or processing line or module that results in the significant advancement of packaging and processing machinery technology by either introducing a new idea or modifying an existing principle. The design concept and implementation are weighted highly in the bestowing the award. The product must have helped to achieve better business performance.

### 2015 Customer Partnership Award

This award focuses on the customisation of packaging and processing machinery that is required to meet a customer’s individual needs. The winner - either an individual or a team - will be able to demonstrate that the end-user has experienced increased sales, plant efficiency and profitability. The customer’s outcomes will form a large element of the award decision.

### 2015 Imported Equipment Award

This award is designed to recognise the efforts of a company that promotes its overseas principal’s equipment in the Australian market. The equipment itself must represent a high standard of excellence in every respect.

### 2015 Best New Product Award

This award is designed to recognise the most innovative product or equipment in the packaging and processing industry launched in Australia for the first time during AUSPACK 2015. The equipment or product must have proven efficiency or productivity gains, be innovative and have proved and improved cost of ownership.

### 2015 APPMA Scholarship

This will be awarded to a packaging engineer looking to further their education. The scholarship enables the recipient to enrol in a Diploma in Packaging Technology, an internationally recognised and accredited qualification for those wishing to pursue a career in the packaging industry or already in the industry wishing to expand their knowledge and expertise.

Submissions for all awards are due no later than Friday 30 January 2015. All companies within the packaging industry are encouraged to enter; you do not need to be an APPMA member. To access a submission form, email [appma@appma.com.au](mailto:appma@appma.com.au).



A black and white illustration of a person falling into a barcode. The person is in mid-air, with their arms outstretched and legs bent, as if they have just jumped or fallen. They are holding a briefcase in their right hand. The background is a dense, vertical barcode. At the top of the image, there is a white rectangular box with a torn edge, containing the text "Labelling equipment down?" in a pixelated, orange font. The person's shadow is cast on the ground below them.



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## Weighing at the speed of lights



Weighing is seldom ‘front of mind’ unless it is accompanied by an angry morning stare at the bathroom scales. It is, however, one of the most fundamental metrics at the core of manufacturing processes; particularly in the packaged food and fresh produce sectors.

With escalating costs and downward pressure on product prices, growers are continually on the lookout for simple ways to increase productivity. The table grape industry relies on manual packing processes, often utilising casual labour to pack into punnets/boxes/bags ready for supermarket consumers. Labour is typically the biggest cost to a business, but there is another that can go unmeasured - the cost of extra produce given away in overfilled packs. This can add up to thousands of dollars per week if unchecked.

An emerging trend among strawberry growers in south-east Queensland has shown how looking at weights in a different light (or lights, in this case) can lead to substantial savings. Rather than focusing on a numeric weight display, packers have utilised traffic light signals on their packing scales to improve product yields with some staggering results. Other fresh produce sectors and manual packing operations can apply the same improvement and reduce giveaway to potentially achieve considerable gains.

This simple idea has two immediate benefits - reducing overfilled packs and increasing packer speeds. People respond to signals with far less thought process than looking at numbers. Green means ‘go’; red means ‘stop’. It is part of everyday life, transcending language and cultural communication barriers.

By utilising packing scales that have a target-based signal system, packing staff and management alike enjoy immediate benefits, and stringent fill targets can be set for both upper and lower weight bands. Packing staff are able to quickly fill and check that products are correct, and the increased visibility of red/green lights means management can easily oversee performance.

Braetop Berries near Queensland’s Glasshouse Mountains were staggered to find that rechecking several cartons of traditionally packed punnets produced several extra punnets of fruit when using traffic light scales. This was “money in the bank” according to father and son team Peter and Aiden Young.

Terence Roy, a berry farmer from Coolhaven Farms, cites improved packing speed as another instant benefit. “Our

packers work more efficiently since using the light signals on our new A&D Australasia scales - it’s made significant improvements to our productivity in both speed and reduced rework of out-of-spec punnets,” Roy said.

Last year Berry Sweet Farms, one of Western Australia’s largest strawberry producers, replaced regular scales with scales with built-in LEDs, prompting packers when correct weights were reached. Owner Anthony Yewers says he has not looked back since.

“Preventing underweight punnets is essential to our business and customers, but reducing extra giveaway is a no-brainer,” Yewers said. “Using traffic light signals in our packing scales has put a big tick in both these boxes.”

While the above examples are from the berry industry, the ‘packing by lights’ principle is valid for any manual packing process where weight targets are set. With supermarkets pushing for more pre-packed fresh produce in Australia to reduce their own wastage and occupational health and safety risks caused by slippage on dropped grapes, there is a growing move towards table grape pre-packs in both bags and punnets. In this case the traffic light technology could be expected to have similar gains to those seen in the berry industry.

But the technology is not confined to the packing shed, and with many table grape growers still field packing, larger scales capable of handling 9- or 10-kilogram cartons can help improve speeds and reduce giveaway.

Scales with target-based outputs like traffic lights have been around for a long time - typically in more sophisticated and costly models for automated processes. Recently, this feature has been added to lower-cost packing scales, making it a viable option for packing sheds that often have dozens of scales.

In fact, many modern electronic scales have the capability to send outputs to lights or buzzers, although a lot of users may not realise this functionality exists. It is certainly worth checking with your local scale supplier or manufacturer.

*This article was originally published in The Vine, a joint publication of the Australian Table Grape Association (ATGA) and Dried Fruits Australia (DFA).*

A&D Australasia Pty Ltd  
[www.andaustralasia.com.au](http://www.andaustralasia.com.au)





## Safety sensor integration

The Flexi Loop safety controller functionality upgrade fulfills the requirement for cascading of safe switches and sensors, allowing safety doors and servicing panels on machines to be protected up to Performance Level (PL) e in accordance with DIN EN ISO 13849-1.

Up to 32 sensors, including those produced by other manufacturers, can be cascaded and receive voltage supply via loop nodes. This minimises expenditure on cabling and frees up safety controller inputs. The power supply and communication paths between the individual loop nodes can be as long as 30 m, meaning that a full 'loop' may amount to a total length of 960 m. The connection is achieved via an unscreened standard cable with M12 connectors.

When used for packaging machines, the company claims the system almost entirely eliminates the current costs for wiring and for safety inputs and outputs and that it detects if consequential errors are 'masked' by the series connection. The response time of the whole system is reduced, as the response time of the system is significantly shorter than the sum of the response times of the individual sensors. As the system strand monitors each sensor individually, it provides comprehensive diagnostic information during running operation.

**SICK PTY LTD**

[www.sick.com.au](http://www.sick.com.au)

## High-speed, high-resolution thermal inkjet printer

Markem-Image has announced the 1050 integrated thermal inkjet printer.

The printer produces high-resolution serialised data and complex 1D and 2D barcodes on fast-moving production lines in the food, beverage, pharmaceutical and other industries.

The printer can produce text, logos and high-density graphics up to 600 x 600 dpi, at rapid line speeds. It has 600 separate ink nozzles, allowing variable dpi from 1 to 600. The flexible printhead can print codes from 12.7 up to 50.8 mm high.

The snap-in and -out ink cartridges combine the printhead and ink and allow operators to maintain the printer with minimal line interruption.

**Markem-Image Pty Ltd**

[www.markem-image.com](http://www.markem-image.com)

## Orbital wrappers for long products

Fromm orbital wrappers handle loads up to 900 mm long. The standard model FV215 wraps at 40 rpm, while the high-speed model FV205 operates at 90 rpm.

The machines feature front, top and rear stabilising arms, adjustable speeds and roller conveyor feeding. Both models include automatic film cut off at end of the wrapping cycle, eliminating the manual process to attach and cut film.

The machines are available from AWS for purchase or rental.

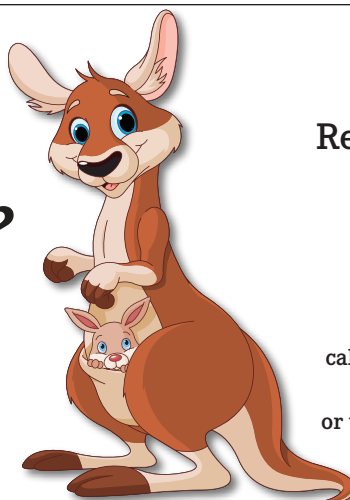
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## Sleeve labelling for beverage cans

The Sacmi Labelling FormSleeve+ labelling system can now apply sleeve labels to beverage cans and also creates a hygienic top seal for the can.

The system, available from HBM Packaging Technologies, is capable of line speeds of up to 51,000 cans/h and eliminates the need for stockpiles of pre-printed cans and subsequent wastage from obsolete can stock.

Sleeve changeover takes 1 h without the need to remove the empty cans from the line, enabling special short-run promotions such as personalisation of cans for special events. The technology increases the space on the product for advertising and communication. The optional hygienic top seal has a tamper-evident perforation.

**HBM Packaging Technologies**

[www.hbm.com.au](http://www.hbm.com.au)



## CIJ printer

The A520i continuous ink jet (CIJ) printer, from Domino, is a resilient printer designed for challenging production environments and comes wrapped in an IP55 marine-grade stainless steel cabinet, with IP66 sealed electronics enclosure. It incorporates the plenum airflow cooling system, which ensures the printer stays cool whatever the production environment.

The TouchPanel user interface (UI) is a separate component, which can be mounted either directly onto the cabinet or remotely to suit production line requirements and layout. The printer can also be controlled via any Windows interface already on the production line.

The product's i-Tech ink system is claimed to deliver the lowest measured consumption make-up on the market and low overall cost of ownership. The machine requires no service and minimal operator intervention due to the presence of CleanFill cartridges that can be changed while the printer is running, and the i-Tech Module containing the working ink and ink filters can be easily replaced in less than 10 min. This is all the maintenance the printer requires, and it's an annual task that can be performed by anyone.

**insignia Pty Ltd**

[www.insignia.com.au](http://www.insignia.com.au)

## Carton made from plant-based, renewable materials

Tetra Pak has announced the launch of the Tetra Rex carton which, according to the company, will be the first to be made entirely from plant-based, renewable packaging materials.

The carton will have bio-based, low-density polyethylene (LDPE) films and bio-based, high-density polyethylene (HDPE) caps, both derived from sugar cane, in addition to Forest Stewardship Council (FSC T) certified paperboard.

Developed in partnership with Braskem, a biopolymers producer, the package will be commercially available in early 2015. Customers using the standard 1 L Tetra Rex with TwistCap OSO 34 can transfer to the new version without any additional investment or modification to their filling machines.

**Tetra Pak Marketing Pty Ltd**

[www.tetrapak.com/au](http://www.tetrapak.com/au)





## Everyone who is anyone in the food industry will be exhibiting at AUSPACK 2015

With AUSPACK less than three months away the expansive line-up of multinational as well as local companies set to exhibit in 2015 is continuing to grow each day.

According to Luke Kasprzak, portfolio director - industrial division, Exhibition and Trade Fairs, "AUSPACK 2015 is targeted to be our largest show to date in both size and exhibitors.

"Companies like Premier Tech Chronos, Beumer Group, Biotec Solutions Australia and Mettler Toledo will be showcasing their latest solutions with many of the multinationals running moving packaging machinery and equipment on their stands," Kasprzak said.

Ingo Jonas, managing director, Premier Tech Chronos (PTC), added that he believes that exhibiting at AUSPACK assists their brand awareness and growth potential in the Oceania market.

"Premier Tech Chronos believes that AUSPACK is the only interesting and innovative packaging trade show in Oceania. We are looking forward to showcasing our entire

portfolio at AUSPACK, including our new vertical form fill and seal systems (VFFS) and new hygienic open mouth bagging machine in an interactive way," Jonas said.

BEUMER Group will be showcasing a series of solutions including the fillpac filling machine and the redesigned stretch hood range. BEUMER Group is an international manufacturing leader in intralogistics in the fields of conveying, loading, palletising, packaging, sortation and distribution technology.

With such an expansive line-up of exhibitors and working equipment being showcased on the stands attending AUSPACK 2015 on the 24th to the 27th of March at the Melbourne Convention & Exhibition Centre is a must. AUSPACK is owned and presented by the

Australian Packaging and Processing Machinery Association (APPMA). For more information and visitor registrations visit [www.auspack.com.au](http://www.auspack.com.au).

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# Sensor technology optimises workflow

Dannielle Furness

It's rare to find a business without the desire to decrease costs and improve efficiency, but some industries are plagued by ineffective operations that are largely regarded as unavoidable. In food processing and packaging it is commonplace to experience significant downtime and idle machine running due to issues that arise when rapid cycle times are instigated. Gaps in proficiency will often be factored in to overall production targets, but what if the key to smarter, faster and more economical production was simply the introduction of enhanced, yet straightforward, technology?

**P**rocess technology and packaging automation systems perform at high speeds; more output in less time presents a distinct economic advantage for manufacturers. Flexibility is a key issue, as these lines now cater to a greater number of product variants and must be able to facilitate rapid machine format changes to deliver. Speed without accuracy can be problematic, as incorrect loading, labelling and positioning cause losses to quality, unwanted downtime and contribute to overall productivity shortfalls.

## Standardisation leads to transparency

The development of the standardised IO-Link point-to-point serial communications protocol has enabled greater interoperability between the plant controller and field level devices, allowing easy implementation of a system that automatically offers increased reliability and efficiency.

IO-Link operates as a master/slave model, where a master device incorporates several ports and each slave device, one. It is an open standard, meaning that it is fieldbus neutral and it functions using standard unscreened sensor actuator cabling (SAC), reducing project planning and installation costs and delivering faster installation and commissioning times.

Through implementation of the IO-Link protocol, previously passive elements on a production line, including sensors and actuators, effectively become active process components. These devices are then able to communicate directly with existing

I/O equipment and to autonomously report state and error information. Enhanced communication capability makes it possible to transfer parameters, such as scanning distance and hysteresis, from a programmable logic controller (PLC) or industrial PC (IPC) directly to the sensor. The advantages are numerous: plant control is optimised as machine format or product changes can be implemented in milliseconds, even for difficult-to-access sensors, and remote maintenance and parameter changes can be carried out via the internet, saving time and avoiding errors.

Quality is enhanced through the continuous monitoring of process parameters and through full documentation of adjustment data. Problem-oriented system diagnostics allow operators to literally 'see what the sensor sees', leading to a reduction in downtime and maintenance costs.

Existing machines and plant can be economically retrofitted, as both IO-Link and standard modules are able to work together.

## Mind the gap

It has been traditionally accepted that counting and detecting packages on a conveyor requires product separation in order to be effective. This separation is needed to accurately read packages, but the process often involves the addition of complex mechanisms in conveyor systems. It also creates a considerable problem, as leaving a gap between products leads to a higher number of collision incidences because packages





© Industriephotoklub/Dollar Photo Club

are inclined to fall when moving. These collisions, in turn, create havoc on a production line by interrupting flow and decreasing end-product quality. Incorrect product grouping and inaccurate label positioning can substantially impede on accurate, free-flowing output and, while there is obvious waste associated with these problems, the flow-on effect of inefficient energy consumption due to stopping and restarting lines is often overlooked. A smooth-flowing, continuous line provides optimum power usage, keeping overhead costs to a minimum.

### What's the alternative?

The absence of a viable alternative to product separation has created an attitude of acceptance, until now. Photoelectric sensor technology is currently sufficiently advanced to enable recognition of a wide range of contours, accurately detecting and differentiating between successive packaging items, on the fly. This means that products can now be accurately counted, without gaps, across a range of packaging shapes, sizes and options. The technology senses the reflective behaviour change on an object's edge contour and uses this reflectivity variation for the output of switching signals.

Rounded, round-out and prism shaped packages, common in the food and beverage industry, are detected without any additional sensor settings. Inconsistent packaging items can be distinguished from one another using IO-Link-compatible

devices that are adapted and configured according to application-specific conditions.

Advanced systems are able to detect objects aligned in a push-push configuration, meaning the requirement for machine elements to execute packaging buffering and separation is eliminated. This leads to better space utilisation, less hardware requirement and shorter conveyor lines; all of which contribute to savings.

### The easiest way is plug-and-play

In many instances, technology simply introduces a new set of problems; complex installation and commissioning or specialist operational training, for example. The implementation of advanced sensor technology is one case where achieving improved functionality and efficiency is actually made simpler.

The advent of IO-Link has presented opportunities to streamline previously complicated processes; utilising the inbuilt intelligence of sensor devices and eliminating complicated in-situ teach-in for machine format changes, as well as improving overall plant operation through central, continuous complete depiction of all line functions - right down to the sensor level.

The plug-and-play nature of today's photoelectric sensor devices means that no setting adjustments are required and connection is achieved using standard cabling. There are no complex operational instructions, eliminating the need for additional specialist operator training. While certain applications may call for ancillary configuration, the devices can then be used to detect multiple products and to reliably identify difficult-to-discern packaging elements including transitions on folded boxes.

### Complete control

The benefits of sensor technology implementation are not confined to one machine or line, as information exchange between each individual machine delivers control over the whole plant, improving overall system capacity. The advantages of this include the ability to trigger downstream processes such as code printing, labelling, barcode reading and camera control.

Inaccuracies in counting can lead to problems further down the line, where the machine controller requires a precise count to execute the secondary packaging function. Eliminating the problem earlier in the line creates a smoother transition between processes and leads to fewer errors overall.

#### Common line problems

- Issues arising from rapid machine format changes
- Inefficiency due to falling packaging and collisions
- Machine downtime
- Incorrect loading when grouping
- Inaccurate path measuring and position detection
- Incorrect labelling
- Quality loss due to crashes
- Inefficient energy use

### The end of the line

In times of rapid technological advancement, it can be difficult to discern where and, perhaps more importantly, when

### Enhanced sensor technology provides advantages

- Streamlines hardware requirement
- Faster conveying times
- Shorter lines
- Less idle and downtime
- Increases overall capacity
- Eliminates falling packaging and collisions
- Improved energy efficiency
- Enhanced communication capability between controller and field devices
- Continuous process parameter

any tangible benefit from 'improvements' will be realised in a commercial environment. It is also rare that the introduction of a new technology or approach delivers greater efficiency and cost savings without presenting additional challenges. Given these constraints, many business owners and operators simply opt for the status quo, regardless of existing inefficiencies and problems.

When an accepted method of operation is flawed to the point of causing further problems downstream, it begs for a smart solution. The development of enhanced sensor technology provides an avenue for faster, smarter and more efficient processing, without additional complex operational procedures or extraneous hardware.



### Sustainable printing inks

Earthinks sustainable printing inks and coatings can represent up to 100% natural materials, are free from glycol and silicones, contain no heavy metals and are near zero volatile organic compound (VOC) levels.

The inks are made using a range of natural products, such as soy, sugars, starches and tree resins. Natural waxes are used to replace standard synthetic grades and natural oils are used to de-foam in place of mineral oils and silicones, ensuring Earthinks are completely in line with food packaging regulations.

The high-quality alternative to chemical inks can be incorporated into a genuine eco-friendly packaging solution. It is suitable for all substrates-packaging printing, ensuring brands can use the sustainable ink option without fear that quality will be compromised.

#### Earthinks

[www.earthinks.co.uk](http://www.earthinks.co.uk)

### Lamination machines

Amcor Flexibles Asia Pacific has partnered with lamination machines supplier Nordmeccanica. The agreement will provide optimised standard machine specifications and options, together with a simplified process for ordering, delivery, installation and commissioning.

The company says the lamination machines will deliver high performance with low energy consumption, minimal emission and solventless or water-based technology.

#### Amcor Australasia

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# Flying robots to take over inventory control

Inventories in large warehouses could soon appear quite different and proceed to take flight, in the truest sense of those words.

**T**he manual inspection of a goods warehouse is a fundamental component of the legally proscribed annual inventory. The conventional procedure is time-consuming and paralyses a majority of the warehouse operations. Even the barcodes and RFID tags pervasively used today are of little help. The entire process still demands a vast amount of time and many personnel.

But a solution may be at hand: the InventAIRy Project aims to automatically localise and record existing inventories with the aid of flying robots.

Marco Freund is keenly familiar with the problems that must be confronted when running an inventory. The certified logistics specialist heads the InventAIRy Project at Fraunhofer Institute for Material Flow and Logistics IML in Dortmund, Germany.

His vision of an optimised inventory system looks like this: "The person in charge is sitting at his desk and, at the press of a button, can inspect inventories or perhaps search for a specific item - without incurring any staffing or logistics costs." To ensure this becomes reality in the not-too-distant future, Freund and his colleagues engineered a "dynamically animated records system" that distinguishes itself - on one rather critical point - from commonly available solutions currently in use today: goods and pallets can already be tracked automatically, via RFID for instance. In doing so, the antennas that the chips read out are permanently mounted to the shelf. The chips are located on the products and are recorded if they pass the readout device. With InventAIRy, exactly the opposite applies: the radio chips remain in their fixed position, the antenna is moved by its integration into

a flying robot. The Inventory Assistants, which the scientists have in mind, are autonomous robots that move throughout the warehouses by flying.

## Putting wings to flying assistants

It is already a reality with driverless transportation systems, so it should also be possible to put them to flight with InventAIRy: in this project, the IML researchers are moving towards the goal of engineering autonomous flying robots that are capable of independently navigating and conducting inventory. These flying assistants should be able to localise objects both in the warehouses as well as the exterior area and be able to track through barcodes and RFID tags. The advantage: these robots act independently of ground-based obstructions. Furthermore, they can move in any direction and see into hard-to-reach places, such as tall storage shelves.

The individual service robot, as an intelligent mobile object, perceives its environment dynamically on two levels: it detects how the warehouse is configured using motion and camera sensors, for instance, and can orient itself within the warehouse. GPS determines its position outside. In addition, the robot records the stored items in terms of content.

The scientists accomplish this with the aid of optical sensors or radio sensors. "We take a look at various key problem sets at the same time: robustly designed, lightweight flying robots that can reliably recognise their surroundings, as well as intelligent software for their route planning and coordination," the certified logistician explained. "To ensure this solution is also appealing to small and medium-sized enterprises, we intentionally dispensed with the installation



*The IML researchers are moving towards the goal of engineering autonomous flying robots that are capable of independently navigating and conducting inventory.*

of an expensive local infrastructure that the robots can use to orient themselves. The researchers want to accomplish this with the aid of intelligent algorithms. The flying objects should prepare maps of the warehouse on a fully automated basis and independently modify them if there are any changes. The bases for this are, for example, ultrasound sensors, 3D cameras and laser scanners.

Current solutions are able to integrate collected inventory data automatically into existing warehouse administration systems, without requiring additional software development. InventAIRy researchers, by contrast, are working on smart interfaces that transmit data wirelessly into existing systems. This means commercial operations save time and money - and documentation errors decrease.


Furthermore, the flying robots can continuously monitor warehouse inventories. "In this manner, it would be possible



*The autonomous flying robot will soon be capable of independent navigation and inventory administration.*

*Image © Fraunhofer IML*

to identify materials bottlenecks at an early stage in production and rectify them even before the shortfalls can occur," adds project manager Freund.

The team's preliminary results are highly promising. "By mid-2015, we intend to start with a partially automated flight. In this phase, the robot equipped with the identification technology hovers - without having to be controlled via remote operation - at one position and circumvents collisions with obstructions, such as shelves," the project manager explains. 



### Three-wheel electric forklift truck

Mitsubishi's FB13-20TCB series of three-wheel electric forklift trucks are suitable for confined working areas such as narrow warehouse aisles and containers. Equipped with a 48 V battery, efficient AC power traction and hydraulic motors and regenera-

tive systems, they are suitable for indoor applications where noise, pollutants or particulate contamination is undesirable.

The trucks come with a higher IPX4 rating, which means the forklift and its systems are protected against water spray from all directions and angles, making them safe to operate in rain. Other features include electric power steering, good visibility, ergonomic controls, comfortable seat and good leg room.

**MLA Holdings Pty Ltd**  
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### Optical size grader for washed potatoes

TOMRA's Modus is an optical size grader for washed potatoes which can sort washed potatoes by width and length, or a combination of both.

The grader delivers throughput of up to 45,000 kg/h and can be operated as a stand-alone size grader or integrated with a sensor-based sorter for quality- and size-grading.

After alignment by a simple shaker and conveyor, the imaging module and electromagnetic diversion system diverts the potatoes of the selected sizes into three different exits.

The grader is supported by an intuitive user interface which enables the operator to define grading settings and view live product data which can be saved for use at a later date for traceability or analysis purposes.

**TOMRA Sorting Solutions Pty Ltd**  
[www.tomra.com](http://www.tomra.com)





## Warehouse management system

Inecom's AccellosOne Warehouse Management System (WMS) version 6.5 is built on the Accellos unifying technology platform, the AccellosOne Platform version 3.0. The product's workflow technology enables end users to modify WMS functionality without source code modifications or proprietary scripting languages.

According to the company, the product enables large wholesale distributors to achieve higher fill-rates, fewer back orders

and better customer service. The solution allows users to enhance processes as part of distribution strategies or continuous improvement initiatives.

In addition to the workflow capacity, the release offers one-click software updates and a robust e-learning framework.

The WMS's advanced event engine leverages the system to generate emails and information on behalf of employees. Real-time information like new orders, receipts, bills or customers that meet user-defined criteria can generate emails, text messages, workflows, database updates or custom actions.

AccellosOne Report gives user-definable performance reports. Dynamic quality inspection is customisable with questionnaires, pass/fail criteria and conditional activities to ensure a sound quality inspection process. The tablet app can be leveraged to execute inspections and record photos.

Integrated document imaging with OCR support enables users to save time by using form templates to scan key information from a printed page and associate it with information stored in the WMS. The integrated ASN manager ensures that the ASN payload that is sent out is accurate and compliant with the requirements of the trading partner.

Cloud-delivered tutorials and help videos are incorporated into the system. Both software updates and content enhancements are made available through the cloud in a way that is familiar to users of smartphones or tablets.

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## IBC liner bags for bulk meat industry

CHEP Pallecon Solutions has launched a range of liner bags for the bulk meat industry. The liners ensure food safety through the use of blue tint and a co-extruded film technology that avoids the need to double- or triple-bag containers to prevent leaks.

The bags are produced with multiple, ultrathin layers within a film that is capable of exceeding the performance characteristics of much thicker mono films; in strength, puncture resistance and flex crack resistance. Unlike monolayer films, co-extruded technology utilises multiple extruders to melt and deliver different high-quality resin materials in a single extrusion head.

The process utilises 100% virgin food-grade resins and the open-top liner bags are FDA, IMS, Kosher and Halal food compliant. The blue tint has been tested independently to ensure it does not migrate into the customers' product.

The liners can be used in conjunction with the company's intermediate bulk container (IBC) rental solutions.

**Chep Pallecon Solutions**

[www.chep.com/pallecon](http://www.chep.com/pallecon)





## Rising to the challenge with a customised crane drive synchronisation

Leading overhead crane supplier Modular Cranes was approached with an unusual problem. The client, a manufacturer of heavy truck trailers, had been successfully using two 22-metre-wide overhead cranes in its factory. The cranes, traditional single-girder bridge designs rated at 12.5 tonnes each, were installed on the same set of support beams spanning the entire length of the factory.

After years of reliable service, the cranes were almost at the end of their life span. However, these specific cranes are no longer in production. The client gave Modular Cranes a very clear brief: find a practical and economical alternative design solution to match the performance and synchronisation characteristics of the existing on-site cranes.

To develop the new overhead crane's two bridge drives, Modular Cranes consulted German drive manufacturer NORD Drivesystems.

NORD proposed an integrated solution consisting of an efficient helical gear unit, a standard four-pole electric motor with a 10 Nm electromagnetic brake and a motor-mounted frequency inverter with an external brake resistor. The two bridge drives were configured to synchronise and match the existing cranes using a simple parameter set-up procedure and were flange-mounted on the crane girder.

The crane is easily operated with the same remote control



pendant, with no additional configuration required. The new crane was able to be synchronised with the existing cranes without rotary encoders due to the precision of the NORD helical gear set and the flexibility of the decentralised frequency inverter software.

NORD configured the gear units using its UNICASE helical inline gearbox series which enables flexibility in the configuration of the optimal drive train for any task and mechanical set-up by providing a wide torque range from 10 to 26 Nm and ratios from 1.35:1 to 14,340.31:1.

To solve the synchronisation issue, NORD recommended a motor-mounted frequency inverter for straightforward installation that makes shielded cables unnecessary.

*NORD Drivesystems (Aust) Pty Ltd*  
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## Sanitary bulk bag filler with metal detection

Flexicon's Bulk Bag Filler is a stainless steel, sanitary filler that detects and separates metal as it fills.

The filler frame is a twin-centrepost design that maximises strength and improves accessibility to bag hooks. It is equipped with an integral metal detector/seperator that detects metal in the free-fall stream of material entering the filler, and then ejects it through a

chute that discharges into a removable drum at the rear of the unit.

The filler incorporates: fill head height adjustment to accept all popular bag sizes; an inflatable cuff forming a seal to the bag inlet spout; a blower to remove bag creases; load cells for filling by weight; a vent port for dust-free air displacement during filling; pneumatically retractable bag hooks; and an automated vibratory deaeration/densification system to maximise capacity and stabilise the bag for storage and shipment.

It is constructed of 316 stainless steel and configured with full-length forklifting tubes, allowing it to be moved throughout the plant. It can be integrated with optional conveyor feed systems, existing plant conveyors or overhead storage vessels.

**Flexicon Corporation (Australia) Pty Limited**

[www.flexicon.com.au](http://www.flexicon.com.au)

## Rotary position sensor

Turck has expanded its QR24 rotary position sensor line with the addition of incremental and analog outputs. Designed from the company's rotary inductive sensor technology, the sensor provides contactless position detection and wear-free performance in a variety of industrial applications.

The sensor provides rotary feedback without the need for contact or bearings. This extension provides many of the same output types as an encoder or potentiometer while eliminating wear and extending sensor longevity.

The sensor's multicoil system provides high resolution with 16-bit noiseless operation. The product also features a double resonator system, providing increased distance capabilities and high-end signal processing with a multicore microprocessor for enhanced speed.

The sensor features a fully potted and sealed IP69K/IP67-rated housing to protect against moisture and dust in demanding environments. It also offers flexible parameterisation via IO Link or Easy Teach, allowing the sensor to adapt to specific application requirements.

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## Servo drive with integrated safety

The Allen-Bradley Kinetix 5500 servo drive

with integrated safety uses the EtherNet/IP network to allow safety signals to travel via the same wires and IP addresses used for control and motion. This eliminates the need for a hardwired safety system, saving time and money in installation and removing potential points of failure.

In addition to motion and control parameters, end users can configure the safety system, to unlatch the safe torque off function, program an unlimited number of setpoints, change safety zoning and re-use code to maintain system validation.

Users also gain improved diagnostics information through the drive's integration with the safety controller. Details on safety-related faults, such as safe torque off requests, are shown on the drive's LCD display. This information can also be pulled into existing information databases and reporting solutions already in use, to deliver actionable safety information.

**Rockwell Automation Australia**

[www.rockwellautomation.com.au](http://www.rockwellautomation.com.au)



## Pallet top sheets

EMD has developed pallet top sheets to protect loads from moisture and dust during storage or transit.

The sheets are available in perforated rolls of 200, in either black, for load security, or clear. They measure 1680 x 1680 mm to fit a standard CHEP pallet. The sheet is placed on top of the pallet and sealed using the last few revolutions of stretch wrap.

### EMD Packaging Systems

[www.emdpackagingsystems.com.au](http://www.emdpackagingsystems.com.au)



## Belt and rod retention systems

The Habasit Micropitch belt system is suitable for high-end conveyors when transfer of products that have a small footprint or are unstable or delicate is required.

Several models are available: the M0870 Flat Top, the M0873 Non Slip, the M0876 Diamond Top and the M0885 Flush Grid. The M0873 non-slip system is suitable for soft product position control and release. The M0870 Flat Top has a smooth belt surface suitable for product transfer and accumulation.

The system offers the smallest possible 6 mm diameter knife-edge transfer with plastic modular belts. It ensures proper alignment of small, soft products and eliminates tracking issues, including belt mistracking, and reduces sudden downtime.

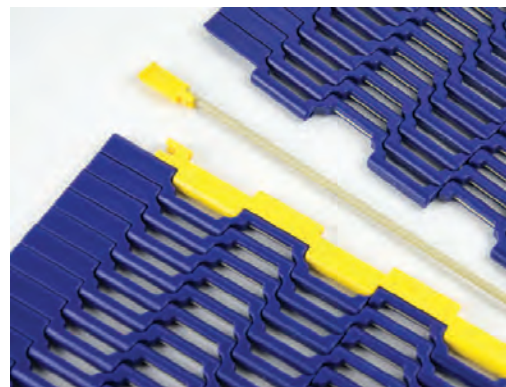
The Habasit Saniclip is a robust, easy-release rod retention system with a safe, tactile feel non-slip surface for easy manual extraction even in wet and greasy environments. Its quick belt opening feature makes cleaning easy and reduces downtime.

Maintenance staff usually require at least 20 minutes to arrange for proper tooling and to open a standard belt. The Saniclip system can be extracted or installed in seconds and no tools are required. Extraction and reinstallation also takes only seconds.

The system is suitable for use with Micropitch M0870, M0873, M0876, M0885 and M1185 belts.

### Habasit Australia and New Zealand

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# Pump systems: hidden costs and opportunities

Glenn Johnson

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Estimates vary, but most sources have estimated that 10-20% of electrical energy is consumed by pumps globally, and in many industrial environments, pumping can consume anywhere from 25 to 50% of the plant's electrical energy. By replacing or upgrading pump systems with modern technology, huge reductions in CO<sub>2</sub> emissions and operational costs can be achieved.

Today, an increasing number of companies and organisations are concerned about the environmental impact of their businesses. For many, socially responsible behaviour has become an integral part of operational strategy. This has resulted in a number of initiatives but the question must be asked: Why don't we focus on the area where the single biggest savings can be obtained?

Putting pumps on the agenda can help you minimise your company's carbon footprint and offer significant economic savings.

In fact, pumps and other motor-driven applications offer an approximately five-times larger savings opportunity when compared to the potential of other more well-known energy users such as lighting. So optimising pumps makes sense - not just in terms of becoming greener, but also because of the financial benefits.

It has been estimated that two-thirds of all pumps installed today are inefficient and use up to 60% too much energy. Most of those currently installed are larger than necessary for the job at hand, and in addition, the majority of the motors that are chosen to drive them are inefficient and often run continuously at their maximum speed regardless of actual requirements. In reality, most pump motors only have to run at full speed 5% of the time. This leads to massive energy wastage all day, every day.

Over the years the pump industry has changed greatly, and the pumps we have today are far more efficient than ever before. This is partly due to intelligent, variable speed motor

technology, which is used to make the pumps run, and also due to advancements in the technology of the pumps themselves.

Replacing pump systems can make an immediate difference and in many cases return on investment will be reached within just a few years, after which the new system results in pure savings.

It should also be remembered that pumps become even less efficient as they age and are subject to wear and tear, so in some cases, replacing old pumps with modern efficient ones, rather than repairing or upgrading - although initially more expensive - will usually lead to lower costs in the long run.

## Knowing what you have

The first step in deciding what to do with your pump systems is to perform an energy check of your pumps and their energy use. Firstly, you should contact your maintenance or facility manager and ask:

- Who is in charge of our pump installations?
- What is our annual electricity consumption?

Next, the information for the energy check needs to be collected, such as:

- How many pumps are installed?
- How old are the pumps and what type are they?
- How do the pumps operate?
- What is the pump service history?

For most sites, the best way to go about this is to engage an external organisation to perform an energy check, in which their experts conduct an on-site assessment. With the information gathered it should be possible to get a prioritised list of the installed pumps, identifying energy usage and CO<sub>2</sub> emissions, running costs and potential ROI for upgrades or replacement.



As is almost always the case with energy-efficiency initiatives, the initial investment in time and effort is returned many times over by the energy and cost savings created.

### Life-cycle costs

One important consideration is the pump's life-cycle cost (LCC).

Many organisations only consider the initial purchase and installation cost of a system. It is in the interest of the plant designer or manager to evaluate the LCC of different solutions before installing major new equipment or carrying out a major overhaul. This evaluation will identify the most financially attractive alternative.

There are two reasons why existing systems provide a greater opportunity for savings through the use of LCC methods than new systems:

1. For each pump system built each year, there are at least 20 times as many pump systems in the installed base.
2. Of these existing pump systems, many have pumps or controls that are not optimised due to pumping tasks changing over time.


Some studies have shown that 30 to 50% of the energy consumed by pump systems could be saved through equipment or control system changes.

Pumping systems often have a lifespan of 15 to 20 years. Some cost elements will be incurred at the outset and others may be incurred at different times throughout the lives of the different solutions being evaluated.

Life-cycle costs can be broken down into eight elements:

- initial costs, purchase price
- installation and commissioning cost
- energy costs
- operational costs
- maintenance and repair costs
- downtime costs
- environmental costs
- decommissioning/disposal costs

A detailed analysis of these cost elements is beyond the scope of this article, but energy consumption is often one of the larger cost elements and may dominate the LCC, especially if pumps run more than 2000 hours per year. Energy consumption is calculated by gathering data on the pattern of the system output. If output is steady, or essentially so, the calculation is simple. If the output varies over time, then a time-based usage pattern needs to be established. It is common to find that power consumption can be up to 85% of a pump's total LLC, while the initial purchase price may only be 5%, and maintenance only 10%.

Replacing pump systems with new systems with variable speed drives, suitably sized to support the actual pumping requirements, can make an immediate difference; and in many cases, return on investment will be reached within just a few years, after which the new system results in pure savings. 

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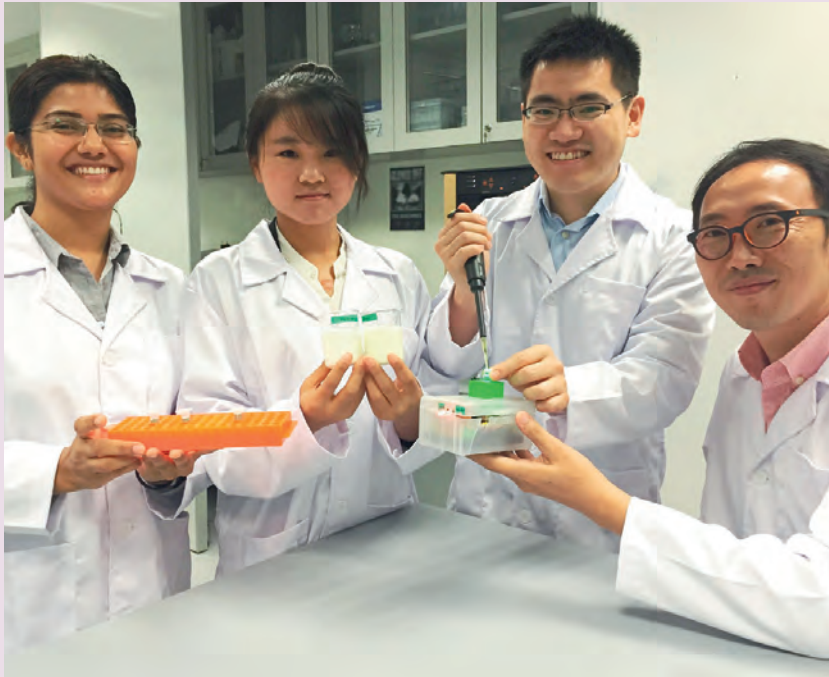


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# Milk Orange to make milk fat measurement more accessible



*The NUS team responsible for developing Milk Orange. Image courtesy of National University of Singapore.*

Milk Orange: sounds like a bizarre new brand of flavoured milk. In fact, it's the world's first fluorescent sensor that rapidly measures the level of fat in milk.

The light purple sensor is mixed with a milk sample and transmits fluorescent orange signals under light when fat is detected. The more fat present, the brighter the orange colour.

Developed by a National University of Singapore (NUS) research team, the sensor is being used with a device currently in development that will enable rapid, on-site measurement of milk fat. The researchers say it will be useful in applications such as dairy farms in developing countries. They also believe it could help enhance the current milk quality control process, particularly in areas with limited resources.

As fat content is associated with the levels of protein and vitamins in milk, it is directly correlated with the nutritional and marketing value of milk. Small-scale dairy farmers who sell milk to large organisations need an inexpensive way to detect the level of fat in milk. Such a device would help farmers separate and price the milk for sale, as well as enhancing the milk quality control process.

Current milk fat measurement methods are impractical - and often too complex and expensive - for use in such situations. To address this need, the NUS team set out to develop a method that is low-cost, easy to use and efficient.

The team screened more than 10,000 fluorescent dyes that are part of the Diversity Oriented Fluorescence Library (DOFL), which has been developed by lead researcher Professor Chang Young-Tae over the last decade.

Having identified a light purple, non-toxic compound that responded well to increasing concentrations of milk fat, the researchers conducted further experiments to ensure that the compound responds only to fat and not to other milk substances such as proteins.

Professor Chang and his team are now working to develop a portable, convenient and inexpensive detector for rapid, on-the-spot milk fat measurement. They also plan to set up a spin-off company to commercialise the technology.

The researchers published a paper on the sensor in the journal *Chemical Communications*.



A.B.N. 22 152 305 336  
www.westwick-farrow.com.au

**Head Office**  
Cnr. Fox Valley Road & Kiogle Street,  
(Locked Bag 1289) Wahroonga NSW 2076  
Ph: +61 2 9487 2700 Fax: +61 2 9489 1265

**Chief Editor:** Janette Woodhouse  
wnift@westwick-farrow.com.au

**Publisher:** Geoff Hird

**Art Director/Production Manager:** Julie Wright

**Art/Production:** Tanya Scarselletti, Odette Boulton

**Packaging Section Editor:** Alice Richard

**Assistant Editor:** Alice Richard

**Circulation Manager:** Sue Lavery  
circulation@westwick-farrow.com.au

**Copy Control:** Mitchie Mullins  
copy@westwick-farrow.com.au

**Advertising Sales**

**National Sales Manager - Nicola Fender-Fox**  
Ph: 0414 703 780  
nfender-fox@westwick-farrow.com.au

**NSW, QLD - Kerrie Robinson**  
Ph: 0400 886 311  
krobinson@westwick-farrow.com.au

**VIC, SA - Sandra Romanin**  
Ph: 0414 558 464  
sromanin@westwick-farrow.com.au

**WA - Mandi Grubisin**  
Ph: 0468 840 739  
mgrubisin@westwick-farrow.com.au

**NZ - Mark Ryu**  
Ph: 0800 44 2529 Fax: +61 2 9489 1265  
mryu@westwick-farrow.com.au

**Germany, Austria, Switzerland - Eisenacher Medien**  
Ph: +49 228 249860 info@eisenacher-medien.de

**Asia - Lachlan Rainey**  
Ph: +61 (0) 402 157 167  
lrailey@westwick-farrow.com.au

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