KNOW+HOW

THE LEADING MAGAZINE FOR MAINTENANCE ENGINEERS FROM **ERIKS**

ISSUE 30

CLEAN AS A WHISTLE

ERIKS takes an in depth look at hygiene challenges faced by the Pharmaceutical and Food and Beverage Industry

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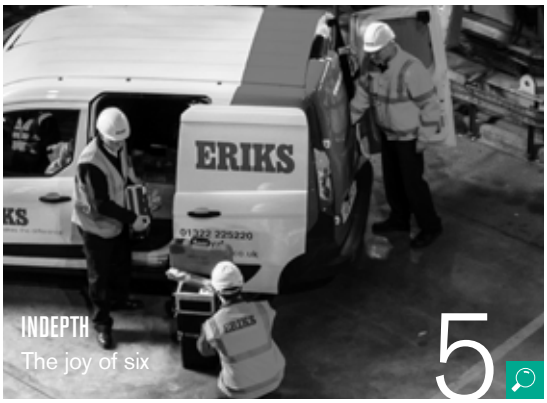
ERIKS



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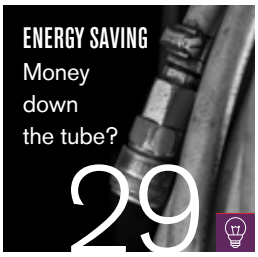

DON'T MISS OUT

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WELCOME TO THE LATEST ISSUE OF KNOW+HOW

A wise sponge, who lives in a pineapple under the sea, once said that "cleanliness is next to managerliness". We're inclined to agree, which is why this issue of Know+How focuses on how manufacturers can improve the hygiene of their production lines and practices for the benefit of both their consumers and their reputations.

In an increasingly consumer-focused world, companies are under pressure to develop a more diverse product range, while remaining efficient, cost-effective and, perhaps most importantly, clean and safe.

Meeting strict government guidelines can be challenging, which is why we have compiled articles covering a range of hygiene aspects for the food, beverage and pharmaceutical industries, from identifying deteriorating insulation, to the benefits of automation in hygienic processes.

As policies on cross-contamination become stricter, we take a look at what the food & beverage and pharmaceutical sectors can learn from each other. Xylem's Paul Winnett gets the facts straight on choosing the right pump solutions for viscous fluids, and we discuss why unexpected "secret" ingredients can spell trouble for manufacturers, and how they can be avoided.

We are also pleased to welcome Deb's Paul Jakeway, who takes a hands-on approach to employee hygiene by introducing the Fantastic Four of hand-washing: protection, cleansing, sanitising and moisturising.

Finally, we discuss why silo budgeting should be binned in favour of more process-based budgeting, and why this could help decrease running costs in the long term.

As always, if you have any issues or concerns you would like to raise on the topics contained in this issue, you can email the editor at knowhoweditor@eriks.co.uk. You can also visit the Know+How website, www.eriks.co.uk/KnowHow, where you can register for a copy of the magazine, enquire about the subjects or projects discussed, or contact one of the contributors.

I look forward to hearing from you.

Richard Ludlam
Editor in Chief

DEBATE!

Silo budgeting: The major cause of bad decision-making

See page 34

Published by **ERIKS UK**, Amber Way, Halesowen, West Midlands, B62 8WG

LATEST NEWS

RESEARCHERS IN PERU HAVE DISCOVERED A WAY TO **GROW POTATOES ON MARS**

Researchers at the University of Engineering and Technology in Peru have demonstrated the ability to grow potatoes on Mars. The Peruvian scientists created a simulator based on extreme Mars-like conditions, including atmospheric similarities and Peruvian high-salinity soil similar to that found on Mars.

The tailored environment for the 'Potatoes on Mars' project was based upon designs and advice provided by NASA and was led by the International Potato Centre (CIP).

The results show promise of future Mars exploration and sustaining life on another planet whilst also calming concerns over not being able to cultivate crops in extremely harsh conditions, as a result of climate change.

NEW COLLABORATIVE PROJECT WITH FIVE UNIVERSITIES IS LAUNCHED TO HELP DISCOVER **NEW DRUGS FOR NEGLECTED DISEASES**

A new collaborative project, known as the Open Synthesis Network (OSN), has been launched to engage students from five universities in the US, UK, and India, to help discover new drugs for patients with neglected diseases.

The project is as a result of a partnership between the universities and the Drugs for Neglected Diseases initiative (DNDi), a non-profit research and development organisation. The research group consists of 25 undergraduate and masters students in Chemistry and in the project's first year, they will work on compounds to target visceral leishmaniasis, a disease which kills nearly 30,000 people every year.

OSN will publish the research in real-time to ensure the faster development of medicines.

NSF IS SET TO ROLL OUT **PREDICTIVE RISK-BASED FOOD HYGIENE AUDITS** RATHER THAN RELYING ON INTERVAL-BASED AUDITS

According to Food Manufacture magazine, NSF International has announced that it is planning to roll out predictive risk-based food hygiene audits across food and drink manufacturing plants.

The industry currently relies on the standard model of interval-based audits followed by remedial intervention whereas the new approach would ensure hygiene compliance by scheduling audits to maximise risk reduction.

The method uses statistical analysis and mathematical algorithms to predict when risk conditions will be at their highest and why. NSF is conducting initial trials but commercial versions of the predictive auditing approach are set to roll out over the next six months.

ONLY 34% OF MANUFACTURING EXECUTIVES BELIEVE THEIR STAFF TAKE CYBER SECURITY SERIOUSLY

The Government has recently launched its Cyber Security Breaches Survey: 2017, which details business action on cyber security and the impact of cyber breaches and attacks.

According to the survey, only 34 per cent of manufacturing executives think their core staff take cyber security seriously on a day-to-day basis which is significantly low compared to other sectors where this figure is 76%.

The report also shows that 46% of UK businesses are exposed to the risks of Bring Your Own Device (BYOD). Therefore, manufacturers need to adapt to the new security demands of an increasingly connected world.

The full report can be downloaded from: www.gov.uk/government/statistics/cyber-security-breaches-survey-2017

THE ROYAL ACADEMY OF ENGINEERING HAS OUTLINED FIVE ENGINEERING PRIORITIES FOR THE NEXT UK GOVERNMENT

The Royal Academy of Engineering has released its election manifesto, outlining five key priorities they believe the next UK government should consider ahead of the general election. The underlying aim is to boost the economy through engineering, manufacturing, and innovation.

The manifesto is based upon extensive consultation which was carried out among 38 UK professional engineering bodies and their 450,000 members.

Included in the list of priorities is focusing the education and skills system on fully unlocking UK talent and potential, as well as, prioritising world class supporting infrastructure, including energy and digital. They note, that these goals are not based on a single parliamentary term and are likely to be achieved through a consistent, long-term, whole-systems approach.

THE JOY OF SIX

IN-DEPTH

There are six product areas at the heart of ERIKS. And there are six reasons why ERIKS is your best source for products for all six areas.

Products are at the heart of everything ERIKS does. ERIKS' engineering know-how, commitment to providing long-term solutions, and great customer service, all exist simply to support and enhance the product offering.

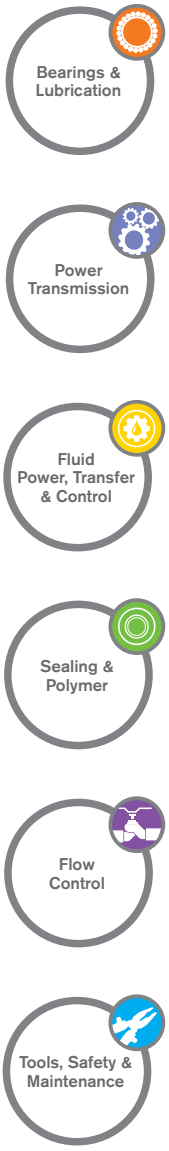
It's an offering which encompasses **SIX** product areas essential to industry:

- Bearings and lubrication
- Power transmission
- Fluid power, transfer and control
- Sealing and polymer
- Flow control
- Tools, safety and maintenance

ERIKS' range of products across those areas has been developed over many years of working with customers and listening to what they want. ERIKS has established long-term partnerships with product designers and manufacturers, to help them create the reliable and energy-efficient products customers need.

And ERIKS is committed not just to selling those products, but to supporting them through maintenance, repair, upgrade and end-of-life replacement.

So what six key elements lie behind those product areas?



1 Sourced and selected for you

It doesn't matter whether you are looking for simple products off-the-shelf to meet standard applications, or a product to meet a unique or complex requirement. ERIKS has the stock and the expertise to meet your needs.

With £23m of stock, and access to over 1.3m product lines, you won't catch ERIKS out with a product requirement, or be fobbed off with a product that needs to be shifted. ERIKS' brand-neutrality means you'll always be supplied with the best option to suit your specific needs – not to suit ERIKS' sales targets.

ERIKS even goes further, and can offer expert advice on selecting products to increase efficiency, improve reliability, and reduce your costs.

2 Supplied the way you want

Getting the products you want is one thing. Getting them the way you want is another.

ERIKS has a central distribution warehouse that can ensure timely delivery of your order, anywhere in the country. But there's also a network of ERIKS regional hubs, stocking products tailored to the needs of local industry. That means even faster delivery, from stock that's virtually on your doorstep.

You can also choose from a range of product supply solutions, such as kitting or bills of materials.

Whatever you want, however and wherever you want it, ERIKS has the answer.

3 Continuity, not counterfeit

When you've found the product you want, the last thing you want is for it to be out of stock or swapped for another brand the next time you need it. Thanks to ERIKS' long-term relationships with leading manufacturers, and a wide range of ERIKS' flagship brands, you can be sure that the product you want is the one you'll get – every time.

It will also be fully traceable, giving you complete peace of mind that's it's a genuine, quality product manufactured to the spec it promises with the materials it claims. So there's no danger of a sub-standard counterfeit component causing a potential catastrophic failure of your equipment.

With ERIKS' fast stock turnover you can also be sure that the product you buy is factory-fresh. Since some products – like electrical components or those containing rubber – can deteriorate over time, that's an important point to remember.

4 Industry inspiration, insight and innovation

ERIKS works across a wide range of industries, which gives the company a unique insight into products, practices, applications and solutions. That knowledge can be transferred from industry to industry, helping you to find new and more efficient, more reliable, safer or more productive solutions to old problems.

5 All-round performance

The better ERIKS' products perform, the better our customers' businesses perform. And the better a customer's business performs, the better it is for ERIKS' business.

That's why ERIKS works to develop long and strong customer relationships – for everyone's benefit.

The proof is in the KPIs and SLAs which ERIKS helps customers to achieve. Along with a lower Total Cost of Ownership, and £2m of signed-off customer cost savings every month.

6 Zero is everything

A zero accidents policy is everything to ERIKS. This commitment to safety extends right across internal working practices, to product selection, to customer contact.

All of which helps to make ERIKS your safest choice for products, in more ways than one.

PERFECT TIMING

In time to meet the increasing demands on machines, and the need for higher-performance belts, ContiTech have introduced the strongest rubber timing belt in their range.

Available in HTD, STD and CTD sections, and an 8M pitch, this new belt from ContiTech makes light work of heavy-duty drive applications.

The Synchroforce Carbon is a heavy-duty belt with a carbon tension member. Combining carbon fibres – which scarcely stretch even under high tensile loads – and a compound specially designed to cope with high demands, the new belt is a durable drive solution for challenging applications.

A boon to OEMs designing cost-effective drives with a small installed size and low weight, the belt transmits rotary motion with high angular precision. With a high tear strength and dynamic load capacity, it enables synchronous drives to operate in extremely tight spaces.

Completely maintenance-free, the Synchroforce Carbon needs no lubrication or retensioning. Resistant to ozone, oil and temperatures from -30°C to +130°C, it's also electrically conductive to ISO 9563.

TECHNOLOGY UPDATE

TUFF CHOICES

Next time you need a spiral wire hose, you can take your pick. Or at least you can take a sharp rock – and still expect the hose to survive intact. That's as long as you choose a hose protected by a Gates' XtraTuff or MegaTuff cover.

Gates XtraTuff is 25 times more abrasion resistant than a standard hydraulic hose cover, while Gates MegaTuff lasts up to 30 times longer than a standard hose in ISO 6945 hose-to-hose and hose-to-metal abrasion tests.

Up to six alternating layers of spiralled, high-tensile steel wire provide the protection. So whether you're working in a rugged mining environment, pulling a hose through a boom arm or across articulation points in utility loaders, Gates' hose can take it.

In sizes -6 to -24, and continuous lengths from 121ft to 200ft, the hoses are suitable for temperatures from -40°F to +250°F (-40°C to +121°C). Even the standard Gates EFG4K Spiral Wire House meets Flame Resistance Acceptance Designation MSHA 2G. And EFG4K-XTF and EFG5K-XTF exceed all performance requirements for SAE 100R12 and 100R13 respectively.

SEIZE THIS ANTI-SEIZE GREASE

The latest addition to the ROCOL FOODLUBE® range is the NSF H1 registered, certified Kosher and Halal, Anti-Seize grease.

Not simply food industry compliant, but actually specifically designed for the industry, FOODLUBE Anti-Seize is a premium performance grease that retains it's consistancy and doesn't set firm when used on joints, threaded fasteners, fixings, bolts and nuts.

Its advanced non-drying formula allows controlled assembly and disassembly of machinery over long periods. And its wide operating temperature range (-30°C to +450°C), and water wash-off and wash-out resistance, make it ideal for the harsh, wet or corrosive environments found throughout the food, beverage, meat, and dairy production sectors.

Optimised for use on stainless steel, FOODLUBE Anti-Seize prevents pick-up, galling, seizure and corrosion, helping to reduce disassembly time, avoid damage to costly components, and extend equipment life.

Meeting all relevant certifications and food regulations, ROCOL FOODLUBE Anti-Seize ensures full audit compliance for complete peace of mind.

OFFICIALLY FIRST FOR QUALITY

Rexnord has become the first chain manufacturer in the UK to be awarded ISO 9001:2015 for quality management.

More than 20 years after it was awarded its certification for achieving the original ISO 9001 quality standard, the company's site in Bredbury, Stockport has met all the requirements of the latest update of the standard.

The new certification proves the company has lost none of its commitment to exceeding customers' expectations in the intervening decades.

The quality audit covers manufacturing, product, value for money, skills, training, continual improvement and delivery punctuality at the site, which is one of the largest facilities of its type in the country.

The Stockport Service Centre produces conveyor chain and attachment chain to customer specification. Its Operations Manager, Alec Annand, explained that receiving the ISO certification "demonstrates our ability to meet our customers' exacting requirements by providing quality solutions delivered on time and to the highest quality levels."

A SIMPLY BETTER PNEUMATIC SOLUTION

Launched at Hannover Messe 2017, the new IMI Norgren ISOLine™ pneumatic actuator range is a "fit and forget" solution, offering simpler installation, longer service life and lower maintenance costs.

Incorporating the new Norgren Adaptive Cushioning System (ACS), ISOLine™ improves pneumatic system performance, with a lower breakaway pressure and reduced minimum speed. In a range that's up to 15% lighter than previous models, with bore sizes from 32-125mm, the ISOLine™ features polyurethane seals for low-friction operation and long life, and also promises lower leakage.

The new ACS solution automatically adjusts the cylinder cushioning for changing loads, eliminating the need for manual cushion screw setting. This means that no specialist knowledge is required, and the installation process is quicker and easier too.

Conforming to ISO 15552, the ISOLine™ will appeal to system designers for more than just its clean profile and modern look. It also has additional switch mountings and a range of Profile and Tie-Rod cylinders, offering greater design flexibility and versatility.

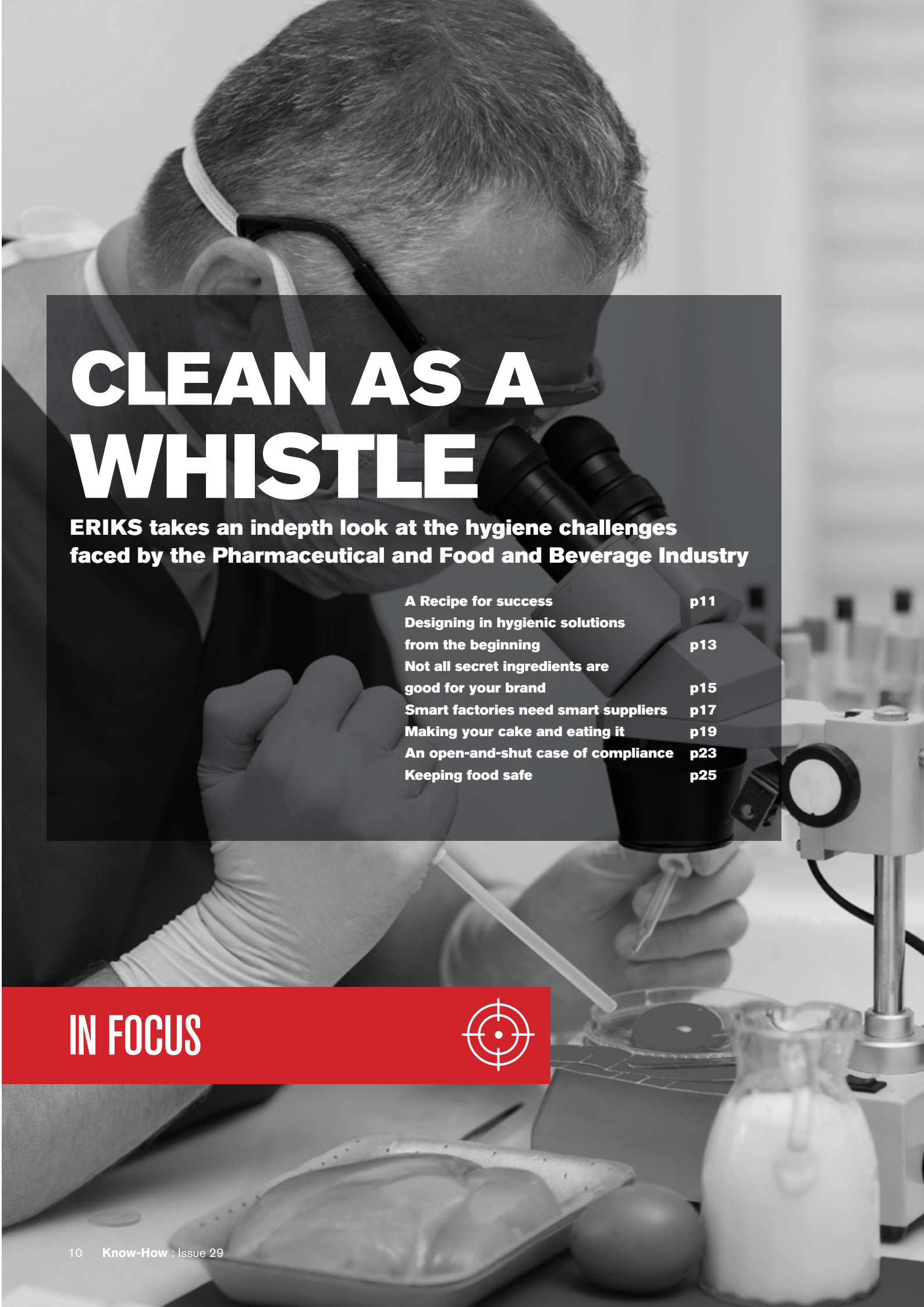
LOCTITE®

Losing money with parts vibrating loose or joints leaking?

Whatever your industry, LOCTITE has an adhesive solution.

CONTACT US NOW

Henkel



CLEAN AS A WHISTLE

ERIKS takes an indepth look at the hygiene challenges faced by the Pharmaceutical and Food and Beverage Industry

IN FOCUS

A RECIPE FOR SUCCESS

Responding to changing demand, seasonal trends and even the legislative landscape, can present a herculean task for businesses but what can the food & beverage industry and the pharmaceutical sectors learn from each other, if anything?

A closer look at the food and beverage industry

In an increasingly consumer focused society, the food and beverage industry is facing increasing pressure from a number of channels, which in turn is placing a greater strain on manufacturing processes.

The food manufacturing industry abides by stringent health and safety measures, including infection control – ensuring that all bacteria such as e-coli, salmonella and listeria are killed before coming into contact with any food items. Bacteria is obviously a living organism and will find a way to survive and reproduce which is a potential risk factor for many food processing plants. Cleaning therefore is rigorous and often takes place periodically throughout the day, to ensure food safety standards are maintained.

Where things get interesting is when new products and systems join the production line and how businesses flex to incorporate these changes day-to-day. Looking to the wider market, a food-on-the-go lifestyle means consumers are demanding greater choice than ever before, with smaller portions that are packaged suitably for eating while out and about. Other important factors include healthy eating and more importantly government legislation that is calling for a reduction in fat, sugar and salt within our foods. In some instances, product sizing e.g. a 20 per cent reduction in the size of chocolate bars, has been reduced to help curb unhealthy lifestyle habits. What's key here is not only the changing demands on the processing equipment for these items, but also how these factors influence the finished product.

As most bakers will know, reducing sugar and salt content can drastically affect the taste and look of the finished product, but it's important to remember that these ingredients also act as preservatives. Industry faces numerous challenges in this increasingly consumer centred society – keeping up with changing demands, while finding new ways to create old favourites, with a similar shelf-life.

Pressure on production facilities is also increasing and many of these issues are exacerbated by legacy equipment within the manufacturing plant which can be hard to flex and change to meet requirements. In reality, while the major manufacturing players aren't going to disappear, the smaller local firms are well positioned to meet this constantly changing demand but for how long?

A closer look at pharmaceuticals

The pharmaceutical sector is changing fast and there are numerous pressures and challenges ahead, not least with Brexit negotiations and the continuing financial pressures within the health service.

While talks continue around more structured pricing agreements, other topical issues for the sector remain about R&D and more crucially the Accelerated Access Review, which aims to introduce what is described as 4-6 transformative technologies to market. The exact nature of these technologies is currently unclear and it could be drugs or technology – either way, the sector is waiting with bated breath. What is concerning, is that NHS England continues to tighten its grip on budgets and this will mean that the pharmaceutical industry is set for further change.

Regulation of the industry however remains tight and fully assured and while governance may be altered, as a result of Brexit, the industry can rest assured that stringent regulation will remain. One key aspect being the hygiene of the manufacturing processes, in order to minimise risk of contamination. Here both the pharmaceutical and food & beverage industry draw some comparisons in cleaning, both achieving agreed levels of hygiene in accordance with written procedures. In addition, records must be kept as a form of validation in the event of any future problems.

In the pharmaceutical industry however, the scope of the clean must go to a microscopic level, highlighting the importance of maintaining excellent facilities and equipment that are properly maintained and calibrated. This is imperative within an environment where contamination poses a real risk for the medical effectiveness of the finished product. Regular inspections and risk assessments ensure that all products meet with stringent regulations including the EU Good Manufacturing Practices.

The two sectors may be seemingly disparate on the surface, yet the same issues are at play across both. In fact the two are intrinsically linked, particularly as we grow to understand more about how lifestyle habits impact upon some of the major diseases in today's society such as diabetes, food allergens and intolerances and even potentially cancers. In fact, one of the greatest threats to human health is in fact the rapid growth and evolution of viruses – focussing attention back onto the topic of hygiene and mitigation at source.

In short, as two of the leading sectors within the UK economy, there is much to gain from shared experience. While there may not be a single recipe for success, the gap between the two is closing in some aspects, and there is much to be learned. Health foods are a perfect example and perhaps in coming months, we will see some closer collaboration between the two sectors, in the development of new health food products that help to tackle the growing health crisis in the country. Perhaps therefore it is time we stop looking at the differences and consider how each sector can support one another.

For more information on ERIKS UK, please visit www.eriks.co.uk

DESIGNING IN HYGIENIC SOLUTIONS FROM THE BEGINNING

In tough working environments like the food processing sector, pumping delicate viscous fluids – that contain solids, is a day-to day occurrence. When it comes to specifying equipment therefore, it's imperative that businesses specify products that are not only fit for purpose, ensuring the quality of the finished product – but also maintain impeccable hygiene standards. Here Paul Winnett at Xylem talks through the importance of choosing the right pump solution and some of the key features to look out for.

Paul Winnett
General Manager - Speciality Industries, Xylem

As with most manufacturing sectors, the food and beverage industry has a number of issues to bear, not least in its continuing commitment to stringent hygiene standards but also to ensuring the continued efficiency of their plant. In turn, the pump industry and wider markets have continued to evolve their products in line with the changing demands and now offer a plethora of potential solutions to meet industry needs.

In fact, the food and beverage industry uses a wide range of plant and equipment to keep operations running, and yet one of the biggest causes of fluid handling issues is the incorrect specification of a pump system. First and foremost, it is imperative to understand the medium to be pumped – a liquid for example will require a different solution to the passage of large solids, and so too the requirements for a liquid with solids differs dramatically.

If we take milk products as an example, in its base form it is a liquid, and therefore the pump requirement will be for a liquid based pump. If making ice cream however, the viscosity of the product is much higher and you would require a pump suited to this increased need - a lobe pump being an ideal solution.

Once the type of pump has been identified, there are a number of other factors that need to be considered, not least the installed kilo wattage of the specified pump. This is an important factor and must be considered in accordance with pipe size and also the flow-rate required. Where a pump is incorrectly specified, flow can be affected dramatically leading to blockages but also if pumped too quickly, can cause air to be pumped into the product. In some instances this may not pose too much of an issue, but in some applications the additional air can damage the product and even make it split. Along a similar vein, it's important to consider whether a pulsation-free flow is required, as this can also affect the end product.

Another key consideration in the specification of pumps for hygienic environments, should be the simplicity of maintenance and crucially, the ability to break the pump down in order to clean it. In a vast number of food and beverage applications, there is a requirement for pumps to be cleaned in place (CIP), but not all pumps offer this capability, so it is important to check.

For food and beverage applications, stainless steel is the preferred material of choice, offering protection against corrosion and, if maintained correctly can help ensure good hygiene standards are met and maintained.

Effective cleaning is key to ensuring the integrity of stainless steel and to also prevent corrosion, as well of course to maintaining hygiene standards. Consider therefore products with easy maintenance features such as flush fittings to avoid stagnant product build-up, easily accessible components – that offer minimal disruption to production and ideally those with a small number of moving parts – making the strip down process much easier for thorough cleaning.

Xylem's Jabsco range of rotary lobe pumps, are ideally suited to the requirements of the food and beverage industry, incorporating the latest in hygienic design concepts in order to fulfil customer demand for improved cleanability and hygiene solutions.

Featuring a 316 stainless steel design and choices of bi-wing or tri-lobe rotor, the Hy~line+ range of pumps are designed specifically for the food and beverage sector. Flush rotor fixing screws are sealed to prevent product ingress and shaft seals are front mounted to allow for easy replacement and full accessibility of CIP liquids. In addition, the front loaded single shaft seals are fully accessible from the front of the pump, without the need to disturb the process pipework – ensuring minimal maintenance. The pump also features high specification taper roller bearings, offering over one million hours of life on a typical duty.

Another key attribute of the Hy~line+ is the fully interchangeable bi-wing rotors, which can be fitted without the need to re-time, reducing downtime on site and allowing the pumps to cope with a higher level of abuse. For the Hy-line+ modularity remains a key feature and is offered in three modules; vertical and horizontal foot kits, port kits and the pump module.

When it comes to specifying solutions for tough working environments, like the food and beverage industry, it is important to have the full facts in hand before you begin the specification process. In a sector where hygiene is of the utmost importance, technology can and does offer a helping hand to businesses, but cannot work in isolation. If incorrectly specified, the best pump in the world simply won't deliver – just as when systems are not correctly maintained and cleaned, there is a real risk of a breach in hygiene standards.

Through a better understanding of application needs and the products available to meet these requirements, it is hoped that businesses will continue to reap the benefits of pump manufacturers' vast experience in this market.

NOT ALL SECRET INGREDIENTS ARE GOOD FOR YOUR BRAND

Andy Howard
Segment Specialist - Food, ROCOL

Coca-Cola has some. So does KFC. Barr's Irn Bru and Worcestershire Sauce both contain ingredients they don't want us to know about. But what if your food or drink product has a secret ingredient even you don't know about – until it's too late?

Those famous products' recipes have ingredients which are deliberately added to enhance the flavour. And of course, those ingredients have all been thoroughly and carefully checked and approved for complete consumer safety. But accidental contaminants in your product are another matter. They're potential "ingredients" of food and drink products that no producer wants in their recipe.

That means you have to eliminate the potential for contaminants to enter factory processes at any stage, including during plant and equipment maintenance.

Maintenance at the required intervals is essential, but using the correct food-grade lubricants is essential too. So choosing the FOODLUBE® range of high-performance lubricants from ROCOL® is your safest option.

High-level hygiene

ROCOL has been developing and manufacturing chemicals and lubricants for industry – including the food, drink and clean industries – since even before Coca-Cola was available in the UK.

Now with 135 years' experience, the company still leads the market. And it's continually developing innovative products which not only maximise productivity for customers, but also help optimise customers' long-term profitability, and protect their reputations.

FOODLUBE is the ROCOL lubricants range that's been specifically developed to meet the complex demands of the food and drink industry. All FOODLUBE food-grade lubricants are NSF® H1 registered – meaning that their formulations meet the required hygiene requirements for incidental contact with food, cosmetics and animal feed.

ROCOL is also one of the few companies worldwide to achieve ISO 21469:2006 certification. This is the globally recognised hygiene certification, which helps food and drink processors meet the compliance requirements of their customers. When auditors undertake a retailer, EFSIS or BRC audit, the ISO 21469 certification provides credible assurance that all ROCOL products are hygienically and safely formulated, manufactured and supplied.

Food safety inside and out

ROCOL FOODLUBE's NSF registration and ISO 21469 certification tell you everything you need to know about the food safety of the lubricants inside every can and aerosol cartridge. But what about the safety of the packaging itself?

Foreign object contamination is another very real risk for food and drink processors, and one which ROCOL have addressed with the introduction of DETEX® X-ray and metal- detectable plastic components.

These award-winning plastic actuators and caps are now used on all aerosol cans and grease cartridges for FOODLUBE food-grade lubricants. So unlike traditional aerosol packaging, any FOODLUBE product caps and actuators which become loose in food and drink processing areas can be quickly and easily detected, using standard X-ray and metal detection equipment.

However, the food safety precautions don't end there.

The patented DETEX plastic components are themselves manufactured from safe materials, which are deemed acceptable by the US FDA for use in food processing plants. So you can have three times the peace of mind when you use FOODLUBE products. Firstly, you know the lubricants are certified safe. Secondly, you know the packaging components are too. And thirdly, the components are easily detectable as foreign objects.

Lubrication counts too

Though food safety is critical, it's not the first reason for choosing a lubricant. Obviously, that reason is effective lubrication.

Fortunately, the food safety qualities of ROCOL FOODLUBE don't compromise its lubrication performance.

FOODLUBE lubricants consist of the finest food-grade base oils, including synthetics, renewable oils and silicones. Formulated with the most effective antioxidants and additives, they specifically address the performance and application needs of today's food and drink industries. Combined with DETEX technology, FOODLUBE is a major development in helping food and drink processors avoid costly downtime, product recalls and the risk of reputational damage.

So the recipe for successful maintenance of your production and processing equipment, and for protecting your brand, is no secret. It's equal measures of ROCOL, FOODLUBE, and DETEX.

To find out more, speak to your usual ERIKS contact, visit eriks.co.uk 0845 006 6000

SMART FACTORIES NEED SMART SUPPLIERS

Nigel Ord
General Manager
ERIKS Flow Control

A highly automated, integrated, state-of-the-art production plant demands more than just a comprehensive range of reliable products. What customers really need is smart solutions. Key partnerships between ERIKS Flow Control and leading manufacturers can provide exactly that.

ERIKS Flow Control is not only a leader in valve technology, but also teams with ERIKS dedicated pump, hose and sealing specialists, they also have an in-house actuation centre staffed by technical experts – representing an unparalleled source of flow control know-how.

Integrated solutions for a total system
Nowhere is a fully-integrated, application-specific flow control solution more essential than in the food and beverage, pharmaceutical and cosmetics industries.

These customers need a product that's not only right for their application, but also for their operating environment, where strict hygiene regulations apply.

One of ERIKS' key partners, INOXPA, specialises in the manufacture of stainless steel components (valves, pumps, agitators, blenders etc.), and the management of processes and services for these sectors. Highly accurate metering and dosing are also essential, and ERIKS has in-house experts specialising in the design and manufacture of the complex technology and equipment required.

The resulting integrated flow control systems match customers' capital and operating cost requirements, and help them achieve their KPIs.

Clean, compliant and certified

Tailoring a solution to the sector's specific requirements begins at the design stage and extends through every aspect of manufacturing, installation and commissioning.

To achieve FDA compliance, INOXPA products have streamlined profiles which eliminate dirt traps and maximise surface exposure for wash-down. The clamping system is also specifically designed to resist water ingress even under high pressure, again enabling effective wash-down of all areas.

To avoid contamination risk during installation, products can be pre-assembled in a dedicated environment within the manufacturing facility. Even equipment testing is carried out with medical-grade pure water, ensuring it's completely contaminant-free.

Bringing it all together

Solutions from ERIKS and their key partners guarantee seamless integration and reliable operation.

Specially-designed systems incorporating valves, hose, pumps and seals – and actuation/control systems specifically developed for the product line – can all be integrated and housed in IP-rated enclosures with relevant FDA certifications, guaranteeing no ingress of contaminants, or of water during harsh wash-down regimes.

A recent successfully completed turnkey INOXPA project helped a pharmaceutical plant in the production, storage and filling of pharmaceutical syrups, suspensions, and preparations for drinkable ampoules. INOXPA carried out the entire project from design to installation, commissioning and validation.

The preparation area required 8 diaphragm valves, including one bottom valve, for each one of four 3000 litre preparation reactors. Two further reactors incorporate a manifold with twelve diaphragm valves.

The final product is transferred from reactors to storage tanks using two BioClean 3-50 lobe rotor pumps, via a distribution manifold with forty diaphragm valves. Lastly, the five storage tanks incorporate 35 valves connecting the tanks with the filling lines, and the same model of BioClean pumps. In this pharmaceutical application, cleaning and sanitation are of the utmost importance. The cleaning cycle involves two different cleaning agents, followed by rinsing and sanitation at 85°C. All components in contact with the product are designed to resist the cleaning chemicals and high temperature involved, and are constructed in compliance with BPE and GMPs regulations.

Smart partners
There's more to providing a successful flow control solution than the products alone. A smart solution requires smart thinking and smart partnerships too.

ERIKS' experience in delivering a lower total cost of ownership, combined with asset management know-how, and key partnerships with leading manufacturers, can help customers to achieve the most cost-effective solutions.

For example, is a single large pump always as energy-efficient as two smaller pumps, with one operating only when there is demand? Is it more cost-effective to utilise a valve with smart control to vary its speed, than to change the valve type? Is it possible to simplify the system design to reduce component parts, and therefore to lower the risk of failure?

Through asking these questions and providing the solutions, ERIKS Flow Control experts have achieved lower TCO for customers, and MTBF increases of up to 100%.

However complex or challenging your application, and however specific your requirements, ERIKS Flow Control will deliver a complete integrated solution of pump, valve, actuator and all ancillary components – to optimise productivity, cost-efficiency, energy use, and Total Cost of Ownership.

You don't get much smarter than that.

HAVING YOUR CAKE AND EATING IT

Food and beverage manufacturers want to have the best of all possible worlds: optimum cost-efficiency, combined with consistently high standards of hygiene, and exceptional flexibility for product, packaging and pack size variation. When you not only want to make your cake, but have it and eat it too, process and factory automation technology solutions from Festo can help.

Andrew MacPhearson
Food and Beverage Industry Segment Management, Festo

Continuous production processes need to be reliable as well as efficient. The most effective way of ensuring both is through automation – of mixing and stirring, sterilisation, pasteurisation, homogenisation, filtration, dosing, weighing, filling and storage.

Semi-rotary actuators and linear drives, powered by high-quality air prepared to ISO standards, can open and close process valves throughout the plant. The air quality also plays an important part in ensuring hygiene, and in optimising the reliability and life of the control system.

Keep it clean

Automation equipment in food processing splash zones is subject to water splashes, cleaning agents and dripping food – all demanding corrosion-proof drives, valve terminals, proximity sensors and fittings.

If the installation utilises decentralised control, then Festo splash-resistant, clean-design valve terminals (CDVI) and individual valves (CDSV) should be considered, because they can be installed close to the drives without a protective control cabinet.

Clean-design (CDC) cylinders are also suitable for these areas, as they lack the sharp edges and corners where dirt residues or germs can hide. If process installations need additional guidance, guided cylinders (DGRF) are also available.

Of course washing is essential to remove dirt and debris. But it can also remove grease – which is usually the death knell for an actuator. However, a dry-running seal option prolongs the life of actuators even when the factory-installed grease is completely washed away. The lubrication and seals have FDA certification, and all accessories – such as proximity sensors – are optimised for the environment, and resistant to cleaning agents, heat and mould.

All-round performer

The Festo star performer in food zones is the stainless steel round line ISO cylinder (CRDSNU).

Its gently rounded profile makes it easy to clean, and its unique, self-adjusting PPS end position cushioning saves huge amounts of time during set-up and maintenance.

Put to the test in the extreme environment of a salmon sorting machine, these cylinders more than proved their worth. Continually subjected to humidity, salty sea water and fish extracts, and cleaned daily with strong chemicals, a standard actuator would fail in just a few weeks. However the Festo CRDSNU has been proven to provide long, reliable, lifetime performance.

Signed, sealed, delivered

One seal doesn't fit all environments. So the Festo modular seal toolbox offers a choice of drive seals to suit different harsh environments.

Options include:

- FDA-compliant seals for food use with standard cleaning regimes
- seals for unlubricated and intensive cleaning
- FKM seals for elevated temperatures up to 120°C and acidic environments
- hard scrapers for temperatures down to -40°C and for a variety of harsh applications – including sugar crystals, honeycomb and icy fish scales.

Expertly handled

Festo provide a wide variety of handling solutions for the non-food zone, with drives to suit applications in packaging, labelling, testing and monitoring.

With more than 30,000 standard Festo products to choose from, and servo-pneumatic, electric and pneumatic technology options available, there's no handling application which can't be satisfactorily and efficiently automated.

Systems are delivered ready-to-install, meaning less work, reduced system design costs, simplified procurement and lower process costs.

"Fit-and-forget is our objective," explains Andrew MacPherson, Industry Segment Manager for the UK food and beverage industry. "No two handling systems are the same – ranging from simple pick-and-place systems to linear, cantilever or 3D gantries, and dual rod, kinematic Tripod robotic systems. But all our customers have to do is describe their handling task and we'll eliminate complex commissioning by delivering a plug-and-work solution directly to their installation cell.

Nothing half-baked

With waste and energy reduction being high priorities for most manufacturers, it's increasingly important to take a comprehensive overview of production, maintenance, condition monitoring and energy-saving, throughout the production process.

Less machine downtime, and detecting and eliminating leaks in compressed air systems, are both crucial ways to save.

Choosing state-of-the-art Festo automation technology is one way food and beverage manufacturers can optimise productivity, cost- and energy-efficiency, hygiene and food safety.

And the result for profitability?
A bigger slice of the cake!

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AN OPEN-AND-SHUT CASE OF COMPLIANCE

An FDA audit is a testing time – in every sense of the word – for many businesses. And even the largest businesses can find themselves falling short of requirements for FDA compliance.

Garry Wakeling
Industrial Sealing Manager, ERIKS Sealing and Polymer

In the case of one global pharmaceutical and healthcare company, it was the manway door seals on their storage vessels at one of their UK facilities which failed to meet with the FDA auditor's approval. To achieve the necessary compliance before production could start, all the seals on all the vessels – each one with a capacity of thousands of litres – had to be changed.

Faced with the potentially tricky task of finding a suitable sealing material, and given the scale of the replacement operation and the speed at which it needed to be carried out, the company called in ERIKS Seals and Polymer to lend their expertise and assistance.

Making the difference

Following on from the FDA's inspection of the vessels and their hatches, ERIKS carried out their own survey, and discovered the job was even more complex than it first seemed.

The seals were made from a multitude of materials. Some included adhesive backing. All this was questionable in terms of FDA compliance. And to complicate matters even further, almost every single manway hatch had different hardware, with little consistency of size or hatch closure methods.

The only realistic solution – as recommended by ERIKS – was to manufacture a unique seal for each closure. And the way to do this most economically was to take advantage of the ERIKS Seals and Polymer on-site gasket cutting capability, at the ERIKS Gaskets Technology Centre in Barnsley.

Using the Centre's capabilities, sealing material could be cut from sheet to suit each unique closure. The next question was: sheets of what?

Making the grade

Finding a single material which would seal effectively and meet the FDA's requirements would rationalise purchasing, manufacturing and – most importantly – eliminate the need for multiple compliance submissions to the FDA audit team.

ERIKS' recommendation was Leader Clipperlon 2115 USP.

Leader Gasket Technologies is an ERIKS flagship brand for innovative metallic, semi-metallic and soft gaskets. At the time of the pharmaceutical company's FDA audit, the Clipperlon material grade 2115 had just gained USP Class VI (United States Pharmacopeia-6) compliance. This meant the

material not only more than met the requirements of the company's FDA audit, but its high level of compliance would also future-proof the seals.

In addition, the company's vessels store a large variety of chemicals. Using Clipperlon 2115 USP – with its broad range of chemical resistance – would enable rationalisation of materials, to cut costs and simplify procurement.

Designed to succeed

One particular issue the FDA auditors had with the seals was their potential to fall into the vessel during opening or closing of the hatch, if they were not in the right position.
Obviously this would contaminate the vessel's contents and thousands of litres would have to be disposed of.

ERIKS Seals and Polymer recommended a seal design which incorporated either extending tabs on the outer diameter of the gasket, or slots for the hinge and swing bolts used to secure the lid. These would make it virtually impossible for the seal to pass through the hatch opening.

With the designs approved, ERIKS took the precaution of cutting a cardboard template of each one and testing it on site, before going to the next stage of cutting it from the Leader Clipperlon 2115 USP material. This ensured the design was practical, and guaranteed a correct fit first time for the finished seal.

With all the new seals designed, cut and fitted, the pharmaceutical company's facility was able to continue with the start-up of their manufacturing process, and moved an important step closer to passing the all-important FDA audit.

PURE AND SIMPLE

LEADER CLIPPERLON 2115 USP

Leader Gasket Technologies

- **Designed for high-purity applications:**
  - **pharmaceutical**
  - **semicon**
  - **food and beverage etc.**
- **Natural white modified PTFE – free from pigments**
- **Manufactured with bi-axial orientated chains for a tighter seal in demanding applications.**
- **Hollow glass micro-spheres as filler**
- **High compressibility**
- **Low minimum seating stress value**
- **Ideal for strong acids (except hydrofluoric acid) and alkalis**
- **Suitable for solvents, fuels, water, oil**
- **Up to 55 bar pressure -210°C to + 260°C**

Approvals and Certifications

- **USP Class VI plastics (USP 88)**
- **TA-Luft**
- **FDA 21 CFR 177, 1550 EC 1935 (10/2011)**

KEEPING FOOD SAFE

Paul Jakeway
Marketing Director,
Deb

Paul Jakeway, Marketing Director at skin care expert Deb, looks at the threat of cross-contamination in the food industry – and what manufacturers can do to prevent it.

Figures from the Food Standards Agency (FSA) estimate that foodborne illnesses affect up to 5.5 million people in the UK a year[1]. Commonly known as food poisoning, foodborne illnesses can be triggered by various factors, for example bacteria present in food due to undercooked meat or food which has been left unrefrigerated for a long period of time. Cross-contamination can also be a cause of food poisoning and occurs when bacteria and viruses transfer onto food from a contaminated surface, equipment, other food and people – usually via their hands.

Understanding the threat

Two types of bacteria which present a risk are campylobacter and listeria. Campylobacter is considered to be responsible for more than 280,000 cases of food poisoning each year.

Estimates by the Food Standards Agency (FSA) have indicated that campylobacter causes more than 100 deaths a year, costing the UK economy about £900 million[2]. Listeria causes a disease called Listeriosis and whilst it is rare, it can be equally as dangerous.

About four in five cases of campylobacter poisoning in the UK come from contaminated poultry[3], but the pathogen is also found in red meat, unpasteurised milk, and untreated water. It spreads very easily and has a low infective dose, which means that only a small amount of bacteria in a piece of food can be enough to cause illness.

Listeria is most commonly found in unpasteurised milk and dairy products made from unpasteurised milk. While many bacteria generally infect specific locations within the human body, listeria may infect many different sites, such as the brain, spinal cord membranes, or the bloodstream. Listeria can survive in low temperatures, which means it can grow to potentially harmful levels in food stored in a fridge.

Listeria causes a disease called listeriosis, which can also lead to meningitis or encephalitis (brain infection). People at an increased risk of developing listeriosis include those over 65 years of age, pregnant women and their unborn babies, and babies less than one month old[4].

To avoid the threat of foodborne illnesses, cross-contamination needs to be avoided at all cost.

Controlling the risks

Strict regulations are in place to assure this: under the Food Hygiene Regulation 2006 and The Food Hygiene Regulations Great Britain 2006 all 'food handlers' are required to be supervised, instructed, and trained in food hygiene practices. It also states that they should observe good personal hygiene and routinely wash their hands when handling food. Companies also need to adhere to a Hazard Analysis and Critical Control Point (HACCP) system.

The system identifies hazards in the workplace, such as moments when cross-contamination could occur, and calculates the likely incident rate. Such a system helps food manufacturers look at how they handle food and introduces procedures to make sure the food produced is safe to eat.

Importance of hand hygiene compliance

Effective hand hygiene is widely seen as one of the most effective ways to prevent the cross-contamination of food. Employees in food-handling environments need to frequently decontaminate their hands – not just before and after contact with food, but before and after breaks, and at key moments such as after using the washroom, coughing, sneezing or touching contaminated surfaces.

And yet: research demonstrates that hand hygiene compliance is not always where it needs to be. Some estimates show that 39% of food-handling staff do not wash their hands after visiting the toilet, while 53% do not wash their hands before preparing food[5].

This lack of compliance will have an impact on swab test failure rates and can significantly raise the risk of cross-contamination.

What can the food manufacturing sector do to change the situation? Once a HACCP system has been effectively implemented, it should be used to develop a fully integrated skin care programme – a 4-step system that assures hand hygiene compliance, while also taking into account the skin health of employees.

Four steps to handling food safely

A specialist skin care programme identifies four crucial steps for hand hygiene in food-handling environments: applying protective creams (where appropriate) before work; using hand cleansers after hands become contaminated; sanitising hands in situations where the skin is visibly clean, but potentially contaminated; and applying restorative creams at the end of the working day.

Protective creams can reduce direct contact with specific physical contaminants, help retain natural lipids and moisture in the skin, and make the skin easier to clean. Some manufacturers have created products specifically formulated for the food industry: they protect hands in wet-working conditions, improve comfort and skin strength when wearing gloves, and provide an additional barrier for skin that is exposed to refrigeration environments.

Cleansers are essential to remove dirt and contaminants from the skin during the work day, especially after breaks and visits to the toilet. Antibacterial hand wash products are a good choice for hygiene sensitive food-handling environments. Foam-based products are easier to rinse than traditional liquid or lotion soaps, making them especially suitable for environments where hands are being washed frequently.

1 Food Standards Agency (FSA)
2 www.food.gov.uk/science/microbiology/ampylobacterevidenceprogramme
3 FSA
4 NHS Direct
5 Food Standards Agency (FSA)

Sanitisers, meanwhile, should be used in addition to hand washing before entering locations such as food production areas, where a higher level of sanitisation is required. Sanitisers kill germs and bacteria when hands are visibly clean, but could be contaminated, and are therefore recommended after coughing, sneezing, or touching surfaces that are likely to be contaminated.

Advanced cleansers and sanitisers are now capable of killing 99.999% of transient bacteria. This rate of effectiveness is known as Log 5 reduction. Products that meet Log 5 requirements are 100 times more effective than the more common Log 3 products, which kill 99.9% of transient bacteria.

Some sanitisers have also advanced to be fully virucidal. Combining a highly effective broad spectrum biocidal efficacy with safety and user preference, they meet the highest levels of European microbiological standards.

When choosing antibacterial hand wash and sanitisers it is important to look for products whose formulas have been independently tested and assessed by experts to demonstrate that the products are non-tainting and do not influence the quality and safety of food products.

Restorative products are important too. Applied at the end of the working day, they moisturise, nourish and condition the skin, improving its strength and preventing it from becoming dry or damaged.

Why use a specialist skin care company?

Any products should always be sourced from a reputable company who offers skin care and hand hygiene advice, guidance and technical support.

A skin care specialist should provide site audits, an essential service conducted to help employers and employees understand the work place facilities, working environments, workflow, hazards and hand hygiene requirements. From this, recommendations on the right products for the right places can be made to establish best practice. Regular on-going audits ensure that the system implemented continues to be effective.

The installation of specifically designed dispensers for use with hygienically-sealed cartridge cleansers, sanitisers, and creams is strongly advised. Such systems provide the most hygienic skin care, by reducing to a minimum the risk of cross-infection that can occur if a number of people extract the product from open “bulk fill” dispensers.

Companies should also look for BioCote marked dispensers. BioCote is a market leading antimicrobial technology that is proven to effectively reduce bacteria, mould and fungi on the surface of the equipment. The presence of BioCote’s logo on dispensers reassures employees and customers that excellence in hand hygiene procedures is of paramount importance.

Training is key to compliance

For a skin care programme to be effective, education is crucial. Skin care experts can provide training programmes and materials such as videos, leaflets, brochures, and posters. They can also provide information boards and Skin Hygiene Centres – made from a special material which does not harbour microbes. Staff meetings are a good way to keep skin care on everyone’s mind on a day-to-day basis.

By implementing a fully integrated skin care system, food manufacturers can do more than comply with food hygiene restrictions: if they take a “hands on” rather than a reactive approach, they can address the threat of cross-contamination and hazards to the skin of employees jointly – making sure food remains safe, and hands healthy.

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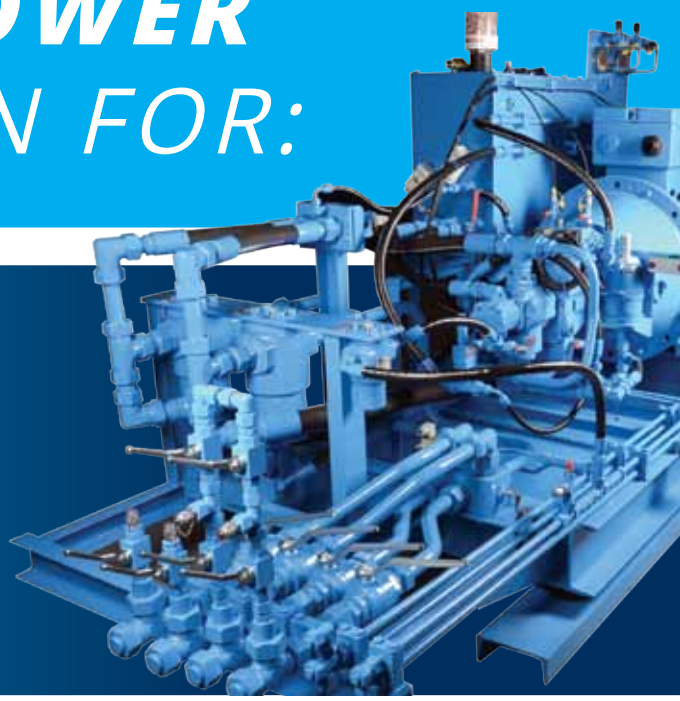

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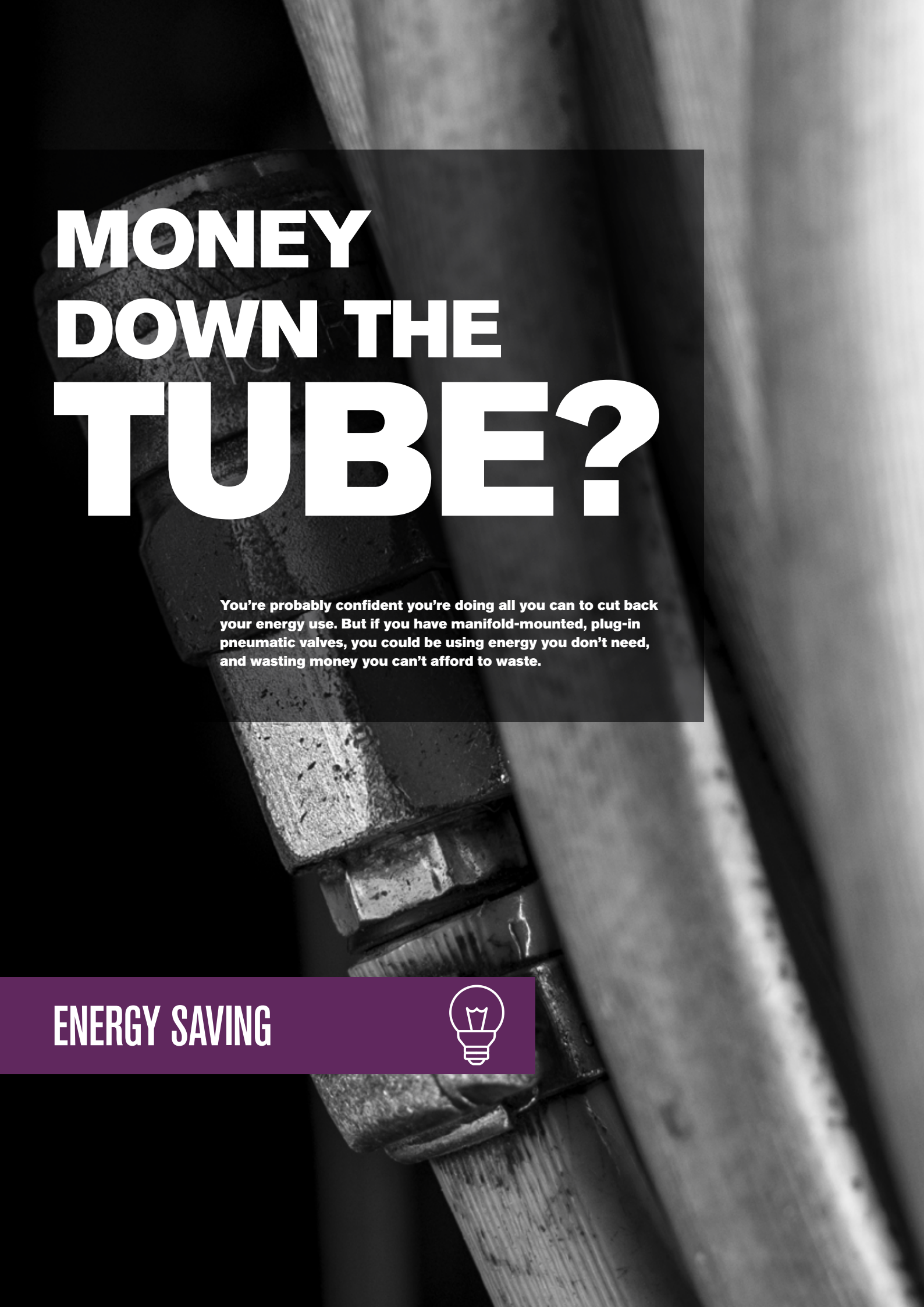

MONEY DOWN THE TUBE?

You're probably confident you're doing all you can to cut back your energy use. But if you have manifold-mounted, plug-in pneumatic valves, you could be using energy you don't need, and wasting money you can't afford to waste.

ENERGY SAVING

Pete Humphreys
Strategic Product Sales Manager, SMC Pneumatics UK Ltd

The problem is that most circuits have two air lines from valve to actuator: one for extend and one for retract. For each valve cycle the actuator is pressurized on one side or the other. This means the tube that connects the valve and actuator also has to be pressurised. Yet the tubing isn't doing any work at all – just transferring the compressed air energy to the actuator.

And what seems like an insignificant tubing volume can add up to quite a significant energy use, and cost.

Pneumatics experts SMC provide an example, in a recent White Paper, of a packaging facility dropping corrugated boxes from a mezzanine down to ground level. The drop-down uses gravity, with mechanical stops to sequence the box delivery. Each stop comprises a pair of 2" bore x 1" stroke air cylinders to operate a brake to stop and release the box. There are four stops on each drop-down, requiring a total of eight actuators and four valves to control them.

Taking the long view

The directional control valves are centrally located on a single manifold, which is anything from 10-25ft from the actuator. That's 10-25ft of tubing, one length of which has to be exhausted and one filled, every time a valve shifts.

Insignificant? Maybe not.

In fact, assuming 10ft of ¼" OD tubing with an ID of approximately .180", the volume is 3.05 cubic inches. With two lines from the valve to each actuator pair, the total tubing volume is 6.10 cubic inches per complete cycle. Each of the 2"x1" cylinders has a total volume (extend and retract sides) of 5.5 cubic inches, or a total cylinder volume of 11 cubic inches.

That means the tubing volume is over half that of the actuators. So over half the energy being developed at the compressor is being used just to fill the tubing lines, which do no actual "work" at all.

What does that wasted energy actually cost?

Paying under pressure

A working pressure of 80 psi and a compression ratio of 6.33, multiplied by the volume, provides a normalized volume of 38.6 standard cubic inches. If the cylinders are actuated five times a minute, compressed air consumption is 193 standard cubic inches per minute – or 0.11 SCFM. And that's only for filling the tubing to the closest station on the drop-down.

There are 3 other more distant stops to consider too, as the chart below shows.

	Tubing Length (inch)	Tubing Volume (in^3 x 2)	Tubing Volume x Compression Ratio (in^3)	Time 5 Cycles per minute (scim)	SCFM
Station 1	120	6.1	38.6	193	0.11
Station 2	180	9.16	58.0	290	0.17
Station 3	240	12.2	77.2	386	0.22
Station 4	300	15.3	96.8	484	0.28
Total	**840**	**42.8**	**270.6**	**1353**	**0.78**

As you can see, the total volume of the airlines from valves to actuators is 42.8 in^3, compared with a total volume of 44 in^3 for all eight cylinders. So virtually half the compressed air produced is consumed for filling air lines.

The factory in SMC's example is in the USA, with electricity at around 8p ($0.10) per KWh. Operating 24/7, a single drop-down would consume around £85 ($110) of electricity per annum just to fill those air lines. As the factory has 50 drop-downs, that's approximately £4,250 ($5,500) of wasted energy every year.

Shortcut to cost-cutting

This may seem an extreme example. But have you never used long air feed lines to provide a clean valve package? Or oversize tubing just because it was handy? Or larger tubing because you considered it more efficient?

If you have, then you've been producing compressed air just to fill tube volume. Not to mention risking liquid moisture build-up in over-long lines, that will eventually work its way into the actuator and shorten its life.

Fortunately, as SMC explain, the solution is simple: mount valves on or nearer to the actuators. This also means fewer connections, which means fewer potential leaks.

In the example above, that one simple energy-saving step would save £4,250 a year from – literally – going down the tube.

HOW TO SAVE 12 WEEKS' DOWNTIME

BEST PRACTICE

Trevor Hilton
HV Sales &
Development, ERIKS

Could your production line, or your entire operation, survive 12 weeks of downtime? It's doubtful. But if one of your medium or high-voltage assets fails, that's the kind of delay you could be looking at before you can get a replacement manufactured and back in action. So one day of Partial Discharge testing to avoid three months of lost production looks like a highly rewarding investment.

Partial Discharge (PD) testing is an effective method of measuring the "health" of a medium / high-voltage asset such as a motor, generator, transformer, switchgear or bus-bar. Repeating the tests regularly over time will determine the rate of deterioration of the winding, so you can assess the risk of failure and take steps to prepare, or undertake preventive maintenance or repair.

But what exactly is PD, how does it occur, and why should you worry about it?

Crossing the void

Partial Discharge is defined in IEC60270 as a "localised electrical discharge that only partially bridges the insulation between conductors" or on the surface of an insulation. There can also be surface PD as a result of conductive contamination by, for example, contaminated oil, dust, or water particles.

Partial Discharge occurs in all medium / high voltage rotating machines from the very first time they're powered up. It can't be avoided but it can be

monitored. PD can also develop in static plant such as switchgear, bus-bars, transformers and cables. If monitored, it can be dealt with before it develops from a minor episode into a major problem.

The voids and gaps in a rotating machine's insulation system which lead to PD, occur inevitably in the manufacturing process, which is why even new windings can be affected. And as time goes by, more voids and gaps can develop due to thermal deterioration, poorly-fitting coils, and coil movement resulting from looseness and vibration.

Although these causes of PD would be less of an issue on their own, they are compounded by the vicious circle of an increase in PD causing more erosion of the insulation, and erosion of the insulation leading to more PD. Leakage currents, travelling through the insulation to earth, can also occur for the same reason.

Ultimately, the resulting insulation decay, and the PD levels and leakage currents, will reach a critical point, and the insulation on the rotating machine, switchgear or transformer will fail completely – usually through a breakdown to ground. The good news is, unexpected failure and weeks of downtime can all be avoided, with ERIKS expert PD testing.

Testing, testing

Using a bespoke mobile test trailer and power transformer of the kind operated by ERIKS PD Testing service, it's possible to carry out the test off line during a one-day shutdown. The results of an off-line test will give more in-depth information about the insulation system's integrity, helping ERIKS to provide a more accurate assessment. In addition, if appropriate sensors such as Capacitive Couplers, Rogowski coils or RF CTs are installed in the machine, data can be monitored and analysed while the asset is on-line.

ERIKS are fully licensed to produce EXE-certified Rogowski coils and to install all the above on-line coupling devices. Please contact ERIK Chesterfield for more information.

Although actual time of failure can't be predicted based on the PD test results, expert analysis can assess the risk so you can plan maintenance to prevent costly in-service failure. Repeating the tests at regular intervals can then determine rate of deterioration, to help build a better picture and provide a more accurate assessment.

While carrying out the PD Test to record electrical discharge, ERIKS can also undertake an additional offline test to measure Tan Delta (Loss Tangent), which represents the material and gaseous leakage losses. This further enhances the evaluation of the insulation system's condition.

The dielectric loss tangent (Tan Delta) is affected by the void content of the insulation. The higher the void content, the higher the loss tangent. The loss tangent represents the sum of solid material (conductive type) losses and the gaseous losses as the voids within the insulation discharge, causing breakdown and ionisation.

Partial discharge in insulation systems is used to measure the magnitude of dielectric loss energy, often referred to as the DLA (Dielectric loss analysis) test. This represents the gaseous discharge losses within the voids. The DLA test has been superseded by modern Partial Discharge testing which provides more data to help analyse the condition of the asset.

The copper circuit of the winding of a rotating machine can also be tested – and its integrity evaluated – by ERIKS, using state-of-the-art surge comparison equipment and a low-reading ohmmeter.

Again, repeated testing will provide a range of results which can be trended to identify deterioration in insulation.

ERIKS provide a full technical report on each asset tested, with a comprehensive conclusion and recommendations. With the information at your fingertips, you can then take all necessary steps to prevent catastrophic failure and remove the risk of a lengthy period of downtime.

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SILO BUDGETING: THE MAJOR CAUSE OF BAD DECISION-MAKING

DEBATE

Richard Ludlam
Marketing Manager,
ERIKS UK & Ireland

Does this ring any bells? You're sat in a meeting to sign off on an important new project and the thorny issue of who is paying for it comes up.

"Well we can't. I've used up all of our budget on the new conveyor," says the Production Director.

Finance quickly jump in. "Well, if we are going to contribute, we'll have to insist on the first option."

Maintenance, sensing problems further down the line, pipe up. "Well you would, it's the cheapest and you won't have to maintain it."

Everybody looks at IT. "No, it's impossible, this new ERP system has bled us dry."

If this sounds familiar you almost certainly have silo budgeting, in which pots of money are given to individual functions, more often than not causing project delays, division and inter-departmental conflict, not to mention non-delivery of project objectives.

In fact, I sometimes wonder whether most organisations, cursed with silo budgets, would be better off accepting that there is no point scheduling yet another budget meeting and, in future, decide the whole thing on the basis of three falls, two submissions or a knockout. It would certainly be quicker.

So why is silo budgeting so painful? Because decisions are inevitably made with each department attempting to inflict minimum damage on their own budget, without regard to the company overall.

Too often decisions are made on the basis of the initial purchase cost, with scant regard for cost of maintenance, operational effectiveness and the total cost of operation.

It is a foregone conclusion therefore that bad decisions will be made. The dominant department (all organisations have a first among equals) inflicts their will on the others and critical issues, such as total cost of ownership, are given little airtime.

We all know where this is heading. The cost in reworks, downtime, spares, maintenance and, crucially, customer satisfaction, all exponentially increase. And then, again inevitably, when it becomes clear in 18 months, two, three or even four years down the line that, quelle surprise, the original decision was wrong, we go through the whole tortuous process again.

What's the solution? Breaking down silos in organisations is never easy, but one of the biggest barriers is budgets, with departments jealously guarding their own pots. Movement away from functional budgeting based on department, towards more process-based budgeting, based on specific processes within the organisation, will help to break down barriers and enable a more holistic view with better decisions.

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