

PUMP ACTION

THE OFFICIAL NEWSLETTER OF THE PUMP CENTRE

SPRING 2016

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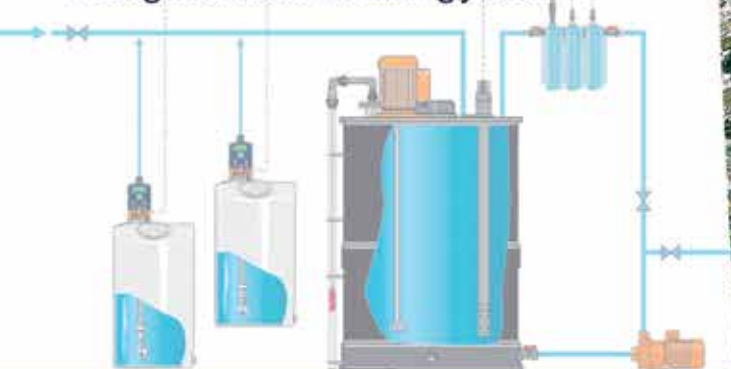
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Editor's Column

Dear Reader

The dust now is starting to settle on the first year of AMP6 and it seems that there has been more restructuring and changes than in previous AMP's. The Water Industry has said goodbye to a lot of great people, but on the positive side we have met and are meeting lots of new contacts, some of whom are new to the industry – so there are exciting times ahead!

Towards the end of last year we ran two great events both of which were very well attended.

The first was our Scottish Mini Conference, this was held on Thursday 1st October 2015 on the outskirts of Glasgow. On the day there were over 80 attendees of which approximately half were from Scottish Water. The welcome address was given by Brian Spence, Senior MEICA Strategist with Scottish Water. The main technical presentations were provided by Dennis Goodlad, principal consultant with the Pump Centre, on the theme of Water & Wastewater Treatment Processes. A mini-exhibition was run alongside the event with a number of small stands filling the ground floor of the venue.

The second was the Water Industry Mechanical and Electrical Specification (WIMES) awareness day which was held on Thursday 29th



Andy Wilson (Hidrostal) presenting at the WIMES Awareness in October 2015

October 2015 in Reading. The objective of the awareness day was to provide an introduction and some guidance on the use of WIMES. The event was chaired by Bob Went, who when he was a Principal Engineer at Thames Water was one of the founding members of the original WIMES Steering Group. The User's experience presentation was provided by Simon Whatley (Ex. Thames Water) and the Manufacturer's experience provided by Andy Wilson (Hidrostal).

This awareness day attracted almost 80 attendees from across the supply chain and generated a significant amount of discussion and Q&A. The feedback from the event was very good and dates for similar events at Reading and Warrington have already been scheduled for 2016. One area that delegates wanted more information was the use of the WIMES Life Cycle Costing Models and this may become the topic for a future awareness day.

We are all looking forward to this year's Pump Centre Conference, the main technical theme is "Innovative Pumping - Challenging the norm". More detail about the Conference is available on page 14 - 17. Don't forget to pencil the date - Thursday 12th May - into your diary!

We hope to see you all on the day.

John Howarth

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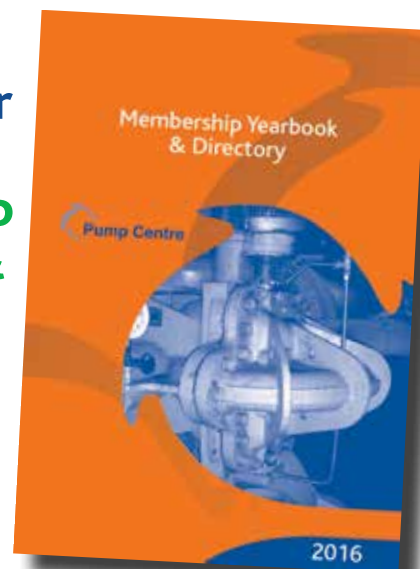
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We look forward to seeing you on our stand at the Pump Centre Conference 2016,



Hazardous Black Country work for Borger's tough pumps

Two rotary lobe Borger pumps are proving their continued reliability and durability at one of the fastest growing industrial waste disposal, cleaning and hazardous waste management companies in the UK.

Black Country-based MTB Midlands Ltd introduced the Borger equipment in 2009 to replace two troublesome progressive cavity pumps that couldn't cope with the arduous applications.

Richard Owen from MTB Midlands Ltd, said: "We certainly put the Borger pumps to the test, but they never let us down. They are used constantly on a day to day basis. Despite the very tough duties with oil, coolants and process waters, the pumps keep on working, which enables us to concentrate on what we're doing and maintain a very efficient and effective operation, with very little down time for pump maintenance."

Designed with Maintenance-In-Place (MIP), the 4kW and 7.5kW Borger pumps (15 & 50 m³/h @ 3-bar) are both fitted with pressure relief valves.

In addition to waste oil water treatment at their purpose-built state of the art, fully licensed oil recycling/recovery treatment plant in Cradley Heath, MTB Midlands Ltd also offer services which include but are not limited to: tank cleaning, high pressure jetting, incineration of contaminated rags and wipes,

secure destruction, industrial shut downs and site clearances, contaminated soil disposal and hazardous waste disposal services.

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The New Wave of Pumping Station Controllers – Control, Comply and Monitor

As the deadline for Private Pumping Station Adoption approaches, wastewater companies are considering how they will monitor their newly adopted assets. A variety of existing and new sewage pumping station controllers are available that respond to the drive for control with compliance, performance monitoring and carbon footprint reduction. An extra bonus is that the best of them also reduce installation and maintenance costs as well as the number of man-hours required to manage each site.

A number of devices have brought together the PLC and RTU functions into a single box including the incorporation of the main level measurement device into the pumping station controller. Now that reliable measurement is available along with the other elements, wastewater companies have access to economical, effective control systems that deliver functions previously prohibitively expensive to program on an individual or small cohort of PLC installations, making these an ideal solution for private adoptable pumping stations.

The key to success has always been the reliability of the core measurement - the level in the wet well or sump. If you can't measure that effectively, then the rest of the control effort will be wasted. The best way to develop a complete self-contained control system is to work backwards from the wet well – start with the level measurement system and make sure that it offers rock solid reliability. For example, Pulsar offers the proven track record of tens of thousands of successful wet well applications all over the world. Including applications with foam, turbulence, debris and solids on the surface.

So, what are the other benefits of using an all-in-one controller, such as Pulsar's Ultimate Controller?

As a starter, installation costs are substantially reduced. By only having a single, compact control device to install, panel space requirements are minimised and the panel itself can be made smaller. A well-designed user interface makes the set-up of a controller very straightforward, minimising the time and cost associated with the set up of a PLC based system.

The real benefits come from the range of sophisticated functions that become available. Most of the following are specific to Pulsar Process Measurement but will give a good idea of the sort of functionality that can be expected from the leading equipment:

Tariff Management (Pulsar patented) – TRIAD periods add costs and the annual extra charges can run into millions of pounds. Tariff avoidance routines make sure that pump running is kept to an absolute minimum during high

tariff periods and TRIAD periods.

Time To Spill (Pulsar patented) – Many factors that affect the time before a station spills, not only rate of change of level but also things like pumping rate compared to maximum and the inflow rate before the system can provide a clear, relevant and accurate warning of imminent spillage.

Pump Trip/Reset – Many man-hours are wasted in trips to site to reset a tripped pump. One of the features built into the Pulsar Ultimate Controller is that it will attempt to automatically reset a pump so you know that if you are visiting site, there is a genuine issue to address.

Burst/Block Alarm (Pulsar patented) – Using predicted change of level rates, system problems can be readily identified, such as a burst rising main or main blockage.

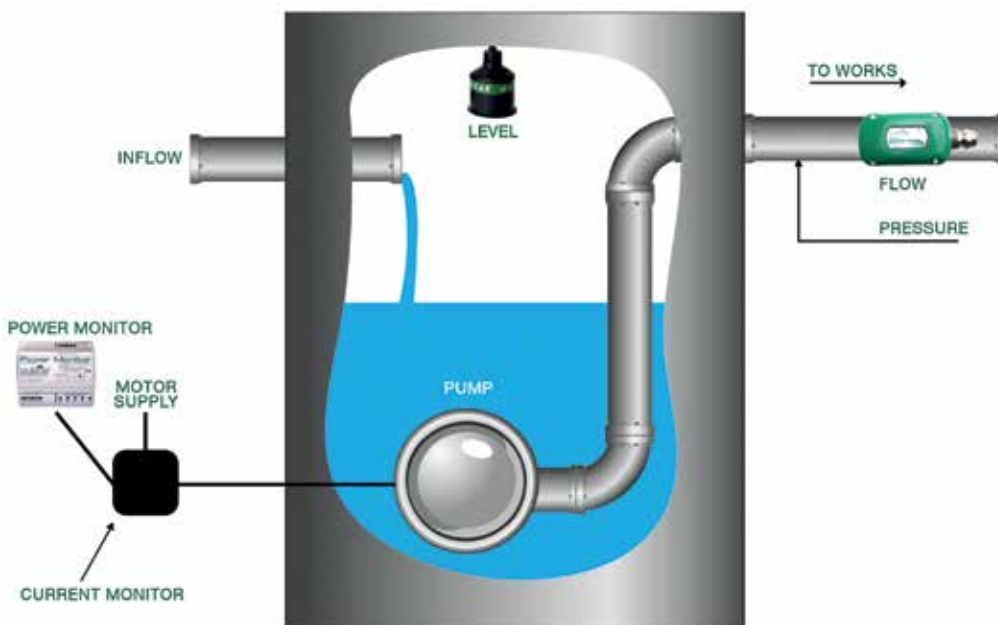
Pump Reversing (Pulsar patented) – Pump blockages and partial blockages can be caused by many things, but can be time-consuming to spot and clear, and can be a hidden issue that affects station efficiency. It is possible to automatically reverse pump motors if a restricted flow rate is detected so, most of the time, staff don't need to worry about pump performance.

Predictive Maintenance (Pulsar patent pending) – Utilising level and current measurement to plot an initial calibration curve for an individual pump's performance. Continuous measurement for every pump run can then be expressed as a relative performance index, allowing an alarm to be set to warn when performance drops below a pre-determined level prompting maintenance and avoiding critical failures.

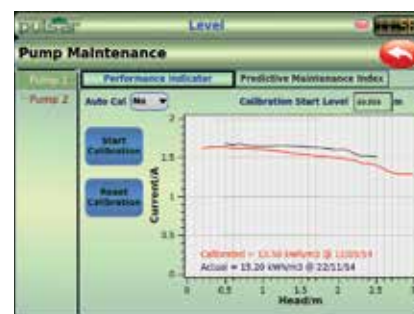
Asset Performance Index (Pulsar patent pending) – Measuring level, flow rate and rising main pressure to calculate the 'dynamic head', providing a way to compare the efficiencies of pumps across a range of stations meaning maintenance can be prioritised effectively.

There are many more functions available and other units similarly include a suite of high-end pump control functions.

In terms of hardware, new options are available that give customers real flexibility in installation and extra functionality that aids compliance and operational management. Different suppliers approach the issues in different ways. At Pulsar we recognise that the management of the pumps is the core control function of the process, and much of the peripheral equipment we supply is directed toward that end. Pump Power Monitors are DIN rail mounted and sit within the motor



API diagram showing all the measured data devices that are used to calculate the power usage of a pump



Screenshots showing the Predictive Maintenance Index curves drawn by the Ultimate Controller



Ultimate Controller in wall and fascia mount options and its peripherals

control area of the panel, so that instrument voltage is only in the C&I section. Flow monitors, such as Pulsar's non-invasive Flow Pulse, can be integrated into the process which are important for compliance because measurements from flow equipment can prove that, in storm conditions, maximum theoretical flow is being achieved even if the pumping station, in a worst case situation, becomes overwhelmed.

Manufacturers are designing the hardware to be flexible. Pulsar offer DIN rail mounted I/O expansion modules available so that any and all sensors can be integrated, logged and controlled dynamically. Some of those peripherals are novel, including an optional infrared camera so that a snapshot of conditions within the well can be included and accessed remotely.

We are undoubtedly in a rich period for innovation in this important instrumentation area. As more opportunities become apparent, manufacturers now have the tools to offer new, interesting and effective solutions to improve control, help companies to hit compliance targets and achieve closer monitoring of pumping station and wastewater networks than ever before.

www.pulsar-pm.com

Atlas Copco VSD compressor saves energy, running time and space for Yorkshire-based precision engineers

Atlas Copco VSD compressor saves energy, running time and space for Yorkshire-based precision engineers

When Calderdale Engineering Services (CES) moved from their premises in Pellon, Halifax to a new base in Boothtown, they chose to replace their existing 15-year old fixed-speed compressor with an Atlas Copco VSD installation, supplied by Pennine Pneumatic Services, that has since reduced energy costs by 50%, running time by 80% and occupies a substantially smaller workshop footprint.

A family owned and run company specialising in precision engineering, CES offers traditional manual turning, milling, boring and machining capability as well as fabrication and engineering services, from one-off welded assemblies to batch component manufacturing.

The move prompted a review of the operational efficiency of the existing compressor installation that has required continuous running in order to supply air for workshop assembly tools, instrumentation and blow-down cleaning procedures. The conclusion was that it was no longer fit for purpose and should be replaced with a new compressor system and AIRnet® pipework within the company's new premises.

As a long-term customer of Atlas Copco Compressors' premier distributor, Pennine Pneumatic Services (PPS) – also based in Halifax, CES called on their expertise to recommend the optimum unit for the company's specific needs. As a result, a new Atlas Copco GA11VSD+ rotary screw compressor was supplied and installed to provide greater efficiency and help make substantial energy savings.

Ian Harrison, Director at PPS, commented: "We have a mutually beneficial and long-standing relationship with CES going back 15 years and we were glad to be able to assist with this upgrade. Our priority is introducing energy-saving initiatives that also save our customers money and we look forward to continuing to work closely with CES in the future."

In contrast to the old, continuous running, fixed-speed compressor, the GA compressor's variable speed drive matches compressed air supply to demand thereby reducing run time and corresponding energy costs by as much as 50%. When combined with the compressor's innovative, in-house designed iPM permanent magnet motor, this results in an average 37% reduction in lifecycle costs compared to that of a conventional fixed-speed compressor.

As an additional point of use benefit, instead of the conventional horizontal design, the GA machine has an upright, vertical, low footprint layout designed to save floor and work space while improving maintenance access – and thanks

to the silent motor and fully-enclosed drive train, the compressor runs as quietly as 62dB(A),

A further cost-saving feature is the system's air ring main, constructed from Atlas Copco's AIRnet modular air piping system. Readily adaptable, it is made from robust, lightweight, powder-coated aluminium tube and designed for easy, low-cost installation with a large selection of engineered polymer fittings. AIRnet's low friction, seamless pipework is corrosion free and thus minimises pressure drop in the system and contributes to energy efficiency.

According to Chris Pateman, CES Technical Director: "The new compressor is a considerable improvement over our previous system due to the reduction of worksite noise levels and its more advanced design that provides significant efficiency savings."

CES company owner, John Pateman, commenting on the system's performance said: "We have been logging the number of running hours on the new machine since our move in. For comparison, when we reached a figure of 300 hours, we estimated that the equivalent running time on our old system, which operated constantly during working hours, would have been in excess of 1,600 hours for the same period – and would have been less efficient in its operation. The new system includes useful features such as weekly runtime scheduling for normal working hours together with a useful one-button manual override, and the system comes up to pressure within minutes from standby."

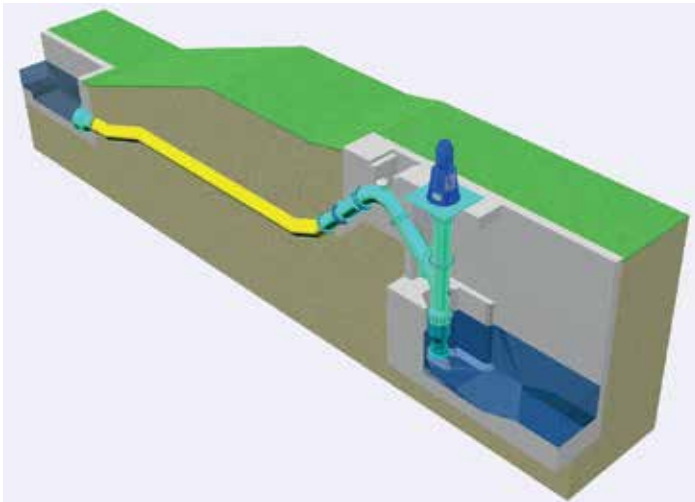
www.atlascopco.co.uk



Bedford Pumps and Peter Brett Associates save stakeholders £3m on Fish Friendly scheme

Bedford Pumps Ltd, the UK's leading manufacturer of large submersible and conventional pumps for the Land Drainage industry, has delivered a Fish Friendly pumping station to Cambridgeshire District Council at Webb's Hole Sluice in the village of Over, Cambridgeshire.

Webb's Hole Pumping Station is unique in so far that each stage of the design process has been carefully considered with regard to its impact on the safety of eels and fish. This brand new station has been constructed with every element of the pumping station design, from the outfall to the pipework, evolved to mitigate any damage to the eels and fish that are present in the river. Webb's Hole Pumping Station is therefore the first in the country to fully embrace the Eel Regulations of 2009.



A fully Fish Friendly pumping station design

A new pumping station was required at Webb's Hole in order to lift flows from the upstream side of the sluice to the downstream/tidal side when the River Great Ouse is in flood. The pumping station, along with additional upgrades to the watercourse, will provide mitigation for the discharge of treated effluent from up to 10,000 dwellings in Cambourne and Northstowe which necessitate an expansion of the water recycling centre at Utton's Drove.



Webb's Hole Pumping Station

Bedford Pumps worked closely with design consultants and project managers Peter Brett Associates, contractor J Breheny, and delivery partner JJ Gallagher,

from design to implementation. The innovative and efficient project design, and the strong team partnerships that have been formed over several similar projects, delivered £3m capital savings on the initial stakeholders' framework estimates. The final design contained the following characteristics: long radius bends on the pipeline; low velocity/low loss; submerged discharge; fish friendly siphon breaker valves with unique paddle arm meeting "streamlined" requirement; sub bell-mouth flow splitters and of course fish friendly pumps.

Bedford Pumps manufactured, installed and commissioned two DAF (Fish Friendly Direct Drive Axial Flow) pumps for Webb's Hole. The pumps, one duty and one assist, have been installed in a vertical suspended position with a 45 degree angle discharge. Each are powered by 30 kW 6 pole electric motors through a gearbox with an external PTO facility, which offers the ability to drive the pump by tractor in the event of a power failure. Each pumpset will discharge 534 l/s at 5.6m head.

Bedford Pumps Fish Friendly pumps have proven credentials awarded from independent research consultants in the field of water management, VisAdvies BV, following extensive and stringent trials. The tests prove conclusively that Bedford Pumps' range of submersible and direct drive pumps are fish and eel friendly with no direct mortality observed from exposure to the pump. Copies of the official report which state that Bedford Pumps have manufactured the "best fish friendly pump on the market" are available on request.

Bedford Pumps' Fish Friendly pumps cover from 400 to 9,000 l/s at 2m to 14m head. Fish Friendly pumpsets are available as submersible, mixed flow or direct drive variants.

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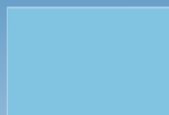
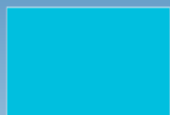
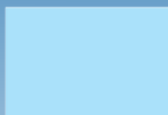
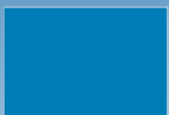


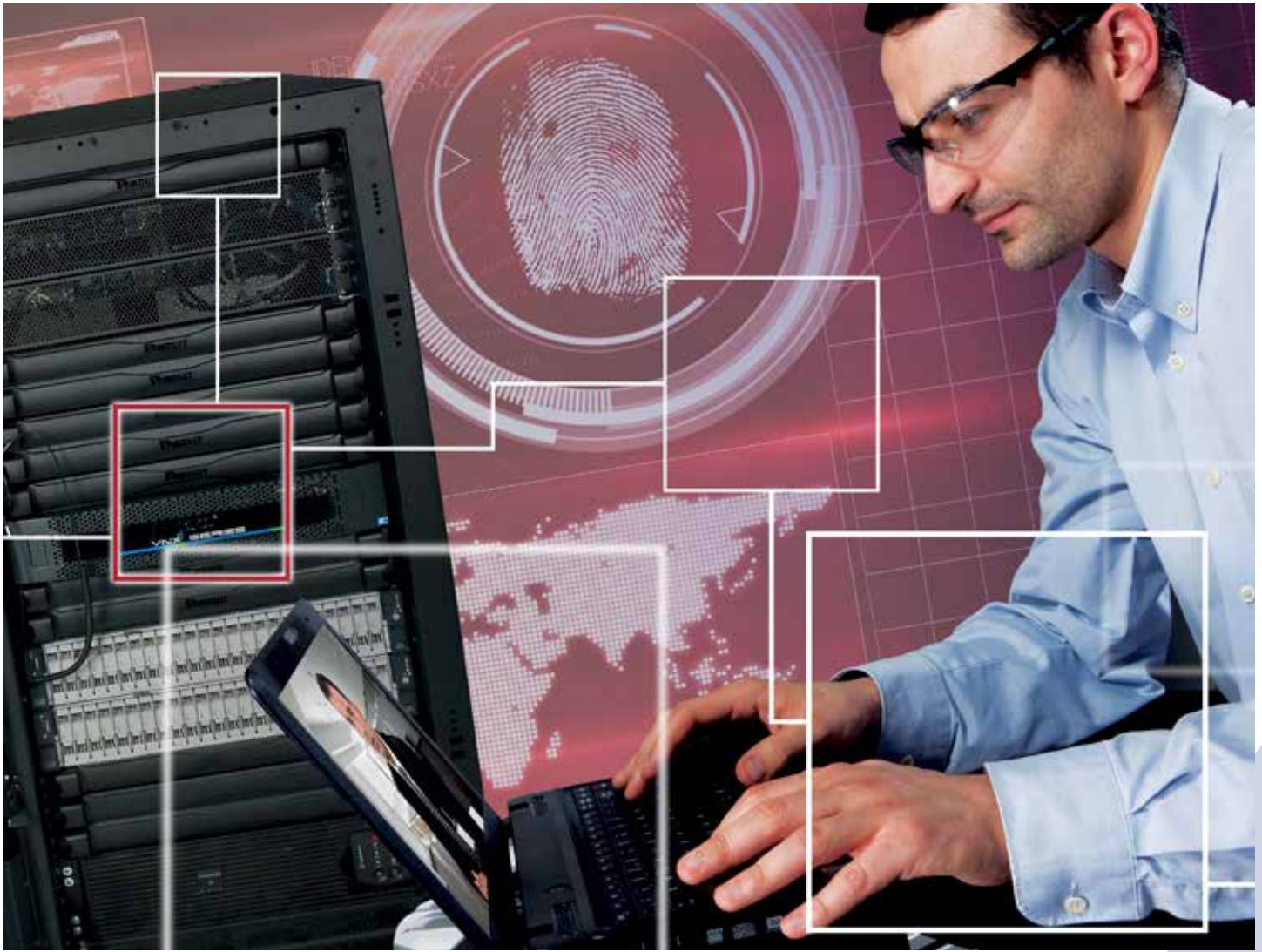
Since January 2015, new motors* coming to market are required to meet IE3 efficiency rating or IE2 efficiency rating when used in conjunction with a variable frequency drive.

(* Exclusions apply)

WEG has a complete range of Premium Efficiency IE3 and Super Premium Efficiency IE4 motors available from 0.12 kW upwards and Variable Frequency Drives ideally suited for pump manufacturers and their end users.

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Systems integration for Industry 4.0

The latest trends and challenges in systems integration

Believe it or not, our world is getting smaller every day. Never before have remote locations been more accessible thanks to communications technology, smartphones and the internet. Connected devices have infiltrated every aspect of our lives, including the most traditional industry sectors. Here, Nick Boughton, sales manager of the Boulting Group, discusses the challenges connectivity poses for industry, particularly with regard to systems integration and the water industry.



Nick Boughton - Sales Manager
Boulting Technology

One question industry has been unsuccessful in answering refers to the number of connected devices that exist in the world at the moment. Although we don't have a definitive number, all the estimates are mind-blowing. Gartner says that by 2020, the Internet of Things will have grown to more than 26 billion units. According to Cisco, there will be 10 billion mobile-ready devices by 2018, including machine to machine – thus exceeding the world population.

The Industrial Internet of Things

It's important to mention that these devices won't all be smartphones, PCs and tablets, but will include wearable technology, web enabled TV, white goods, cars and so on – all connected in a gigantic web of communications. In industry, the phenomenon has several names: the Industrial Internet of Things, Industry

4.0 and Connected Enterprise. Beyond futuristic tags, all these concepts reflect the same reality: the need to optimise production through connectivity and an increased flow of data.

Only fifteen years ago, an industrial plant operated on three separate levels. You had the plant processes or operational technology (OT), the IT layer and in between stood the grey area of middleware - connecting management systems to the shop floor. The problem in most enterprises was that the commercial and production systems were entirely separate, often as a deliberate policy. Trying to connect them was difficult not only because of the divergence in the technology, but also the limited collaboration between different parts of the organisation. For these reasons successful implementation of middleware was rare.

Fast forward to today's smart factory floor that uses the almost ubiquitous Ethernet to make communications as smooth as possible. Supporting the new generation of networking technologies is an increased flow of data, collected and analysed in real-time. However, data is only useful when you can decipher and display it. The next step to industry nirvana is using relevant data for better decisions and predictive analysis, in which the system itself can detect issues and recommend solutions.

Smart manufacturing is based on a common, secure network infrastructure that allows a dialogue – or even better, convergence - between operational and information technology.

Interestingly enough, the trend goes beyond the factory floor and expands to big processes like national utilities, water treatment and distribution, energy and smart grids, everything in an effort to drive better decision making, improve asset

utilisation and increase process performance and productivity.

In fact, some water and energy companies are using the same approach to perform self-analysis on energy efficiency, potential weak points and the integration of legacy systems with new technologies. In a highly regulated and driven sector like utilities, maximising assets and being able to make predictions are worth a king's ransom.

The Connected Enterprise

You'd be forgiven for thinking the whole vision sounds like a utopia. If you work in industry, you know the transition to convergent network architecture can be a little bit more painful than Industry 4.0 makes it sound. One of the main challenges is integrating layer upon layer of systems and technologies from different manufacturers, some dating back several decades.

Luckily, this challenge is now being addressed by the likes of Rockwell Automation, who has teamed up with Cisco to help companies that are keen to take advantage of the new technology and move into the next era of industry.

Rockwell Automation's Connected Enterprise leverages technology to gather and analyse data and transform it into insightful information that helps make better business decisions. The benefits are clear for anyone with eyes to see. Faster time to market, lower maintenance and efficiency costs, resulting in lower cost of ownership, improved asset usage and enterprise risk management are just some of the advantages that come to mind when discussing the potential of the Connected Enterprise.

The real hurdle comes when you transpose the concept into practice. Luckily, Rockwell Automation has identified five easy stages of the Connected Enterprise model. The first stage requires an overall assessment that looks at existing IT and OT infrastructure, as well as processes that currently don't take advantage of the convergence of these two layers.

The next step is securing and upgrading existing IT and OT infrastructure – putting the systems in place that allow two-way communication between operations and business enterprise.

The next two stages focus on data – a central element of the Connected Enterprise. Stage three refers to working data capital. It involves defining and organising production data to deliver insights that allow real-time decision-making. Once the data exists, stage four addresses data analytics – and this is where it really gets interesting.

The aim of collecting more data, storing it and analysing it is to turn it into useful information that helps you change processes or equipment, so you increase productivity, lower costs, boost energy efficiency and improve customer satisfaction.

Finally, the last stage is optimising and collaborating. The Connected Enterprise is not a one-off; it's a change in company culture that places continuous improvement at the heart of the organisation.

System integration challenges

System integration in this connected industry landscape comes with its challenges, so companies need to keep up to speed and get creative with technology. Keeping existing systems up to date and working properly is one of the main challenges of industry and big processes alike.

Another fundamental challenge is getting access to latent data, either by using existing technologies or upgrading systems. This doesn't just mean collecting data, but also storing it, analysing it and displaying it. Only then does data actually start becoming useful – when it turns into knowledge.

Finally, ensuring your system is secure from cyber threats and attacks is a new challenge fit for Industry 4.0. Connecting a system or equipment to a network is all fine and dandy, but it also brings vulnerabilities that weren't there before.

The great thing about systems integrators is that they relish a challenge and they're very good at adapting to new technologies. For this reason, some systems integrators have started working closely with industrial automation, IT and security experts to help overcome the challenges posed by Industry 4.0.

Regardless of whether we're talking about companies in utilities, manufacturing or transportation, the signs are showing that companies want to get more from their existing assets and are retrofitting systems more than ever.

Of course, retrofitting isn't always easy. In many cases, upgrading a system without shutting it down is like trying to change the brakes on a speeding bus – impossible. However, unlike the bus scenario, there is usually a solution. All you have to do is find it.

Flexibility is essential for good systems integrators. Being familiar with a wide range of systems and working with different manufacturers is the best way to maximise industry knowledge and expertise, while also keeping up to date with the latest technologies. At Boulting Technology, we partner up with market leaders like Rockwell Automation, Siemens, Mitsubishi, Schneider, ABB and others, to design and supply tailor-made systems integration solutions for a diverse range of industries, processes and platforms.

The world might be getting smaller and we might be more connected than ever before, but some things never change. Relevant experience, partnerships and the desire to innovate are as valuable as they have ever been in this connected new world of Industry 4.0.

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Is the pump industry ready to talk?

Much has been written about the pace of technological change in recent years. Looking at these developments, we all accept that these advances have mainly made the world a better place. This is also true for the pump industry.

A by-product of this has seen the opportunity to create a holistic intelligent design approach that integrates devices such as pumps, communication units, control and protection equipment, transmitters and drives within a pump solution. This results in a system that operates to its maximum effectiveness and efficiency.

A specific way this has manifested itself is seen in communication platforms that offer a wide range of benefits. This means demand is moving away from a simple pump selection scenario into a much more integrated and systems driven approach. This is quite a sea-change for the industry as the previous focus had been on maximising the inherent engineering to deliver the best energy efficiency on an individual pump basis.

Technically advanced pump companies are able to offer a more sophisticated approach. This can be seen for example in remote management systems that are available on a secure, internet-based platform. Such systems can monitor and manage pump installations in a wide range of applications such as commercial buildings, industrial processes, water supply networks and wastewater plants.

What this means is that pumps, sensors, meters and pump controllers are

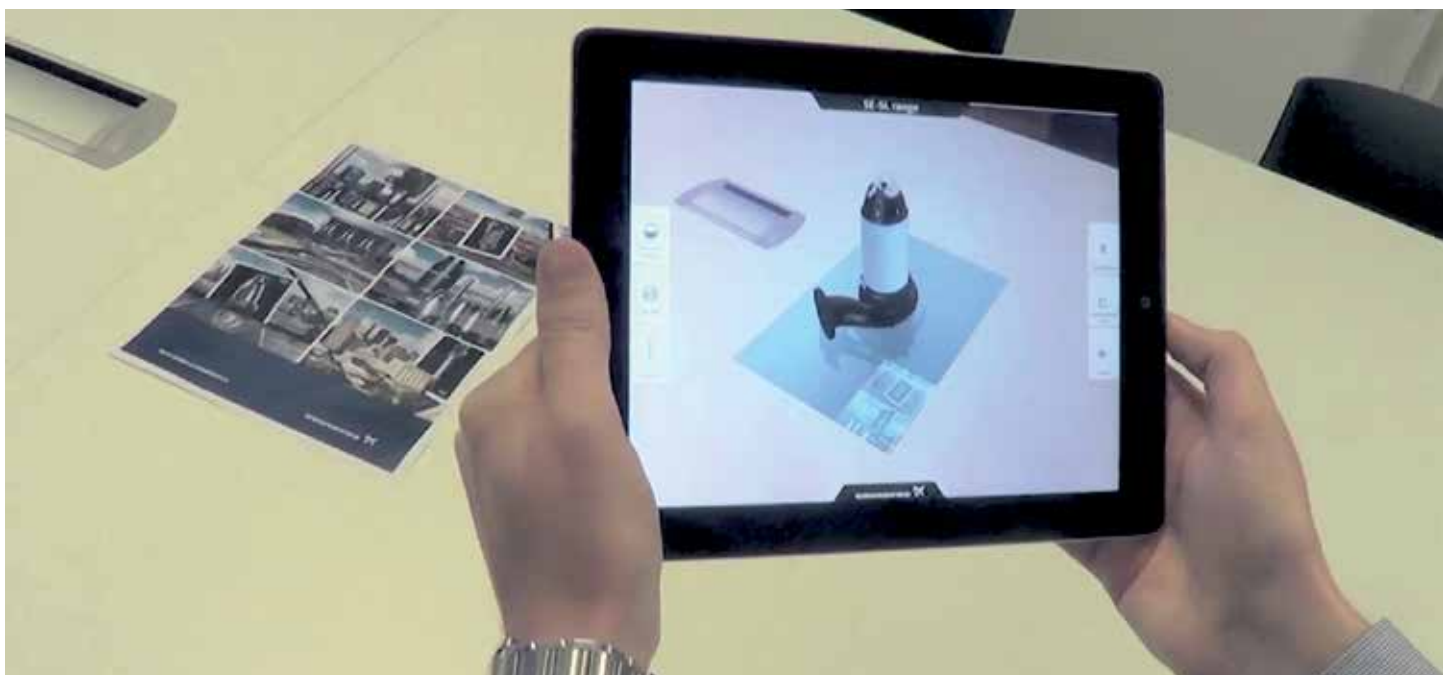
connected to a datalogger. Data is then accessed and provides an overview of the system. If sensor thresholds are crossed or a pump or controller reports an alarm, a communication is dispatched. In this way changes in pump performance and energy consumption can be tracked and documented using automatically generated reports and trend graphs. These can also give an indication of wear or damage, allowing service and maintenance to be planned accordingly.

Remote monitoring and control is entering a new era with the development of wireless sensing devices. Today there are many remote monitoring solution management options that offer efficient and cost effective alternatives that can be used in standalone solutions - for example in retro-fit applications, or in partnership SCADA systems. These will often deliver a more cost effective outcome. Such systems are now more accessible with the introduction of cloud based remote monitoring.

Pump engineering will continue to improve but in stage steps rather than any radical new developments. This will mean that bigger wins will need to be gained in other areas – such as improved overall systems design and fully integrated solutions.

The answers are out there – you just need to ask the right people the questions.

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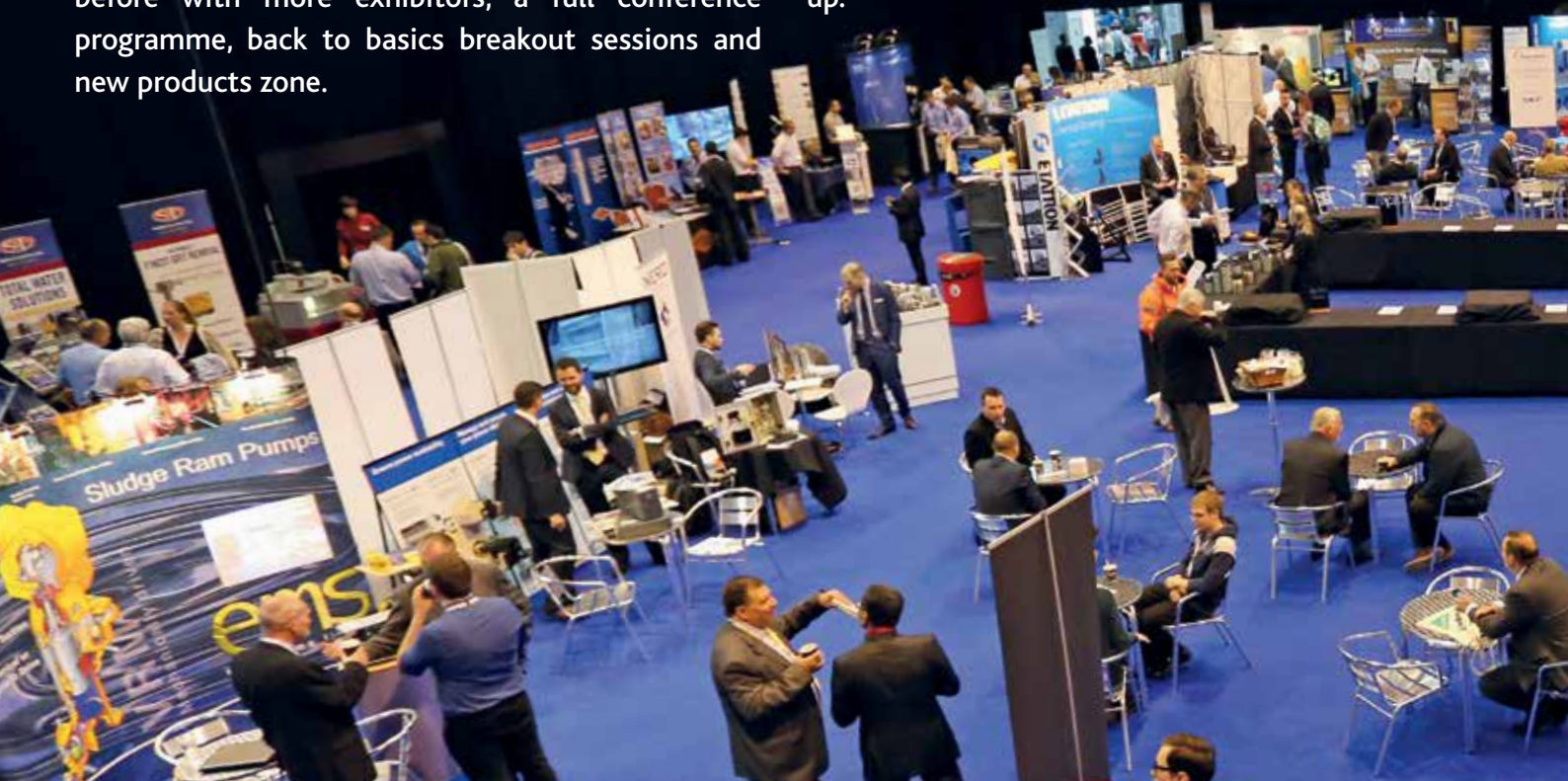
Pump Centre

Conferen

Organised by the Pump Centre

The Pump Centre Conference is the UK's leading conference and exhibition for those involved with pumps and pumping. The event is bigger than ever before with more exhibitors, a full conference programme, back to basics breakout sessions and new products zone.

This year's technical theme is "Innovative Pumping - Challenging the norm" and many key presenters from across pump industry have already been signed up.



Conference Theme

"Innovative Pumping - Challenging the norm"

Visitors to the Pump Centre Conference 2016 will be able to:

- Meet over 90 of the UK's major manufacturers and suppliers.
- Network with industry experts and key players from across the supply chain.
- See the latest products and technology.
- Improve their technical knowledge at the engineering breakout sessions.
- Discover new solutions to their pumping issues.
- Visit the "New Products Zone".

REGISTER NOW!

The conference, exhibition and all the technical sessions are **FREE** to pre-registered delegates. Registered delegates also receive a **FREE** conference pack, proceedings and refreshments*.

(*Subject to availability)

TO REGISTER Simply go to the Pump Centre website: www.pumpcentre.com and follow the simple link to our registration site.

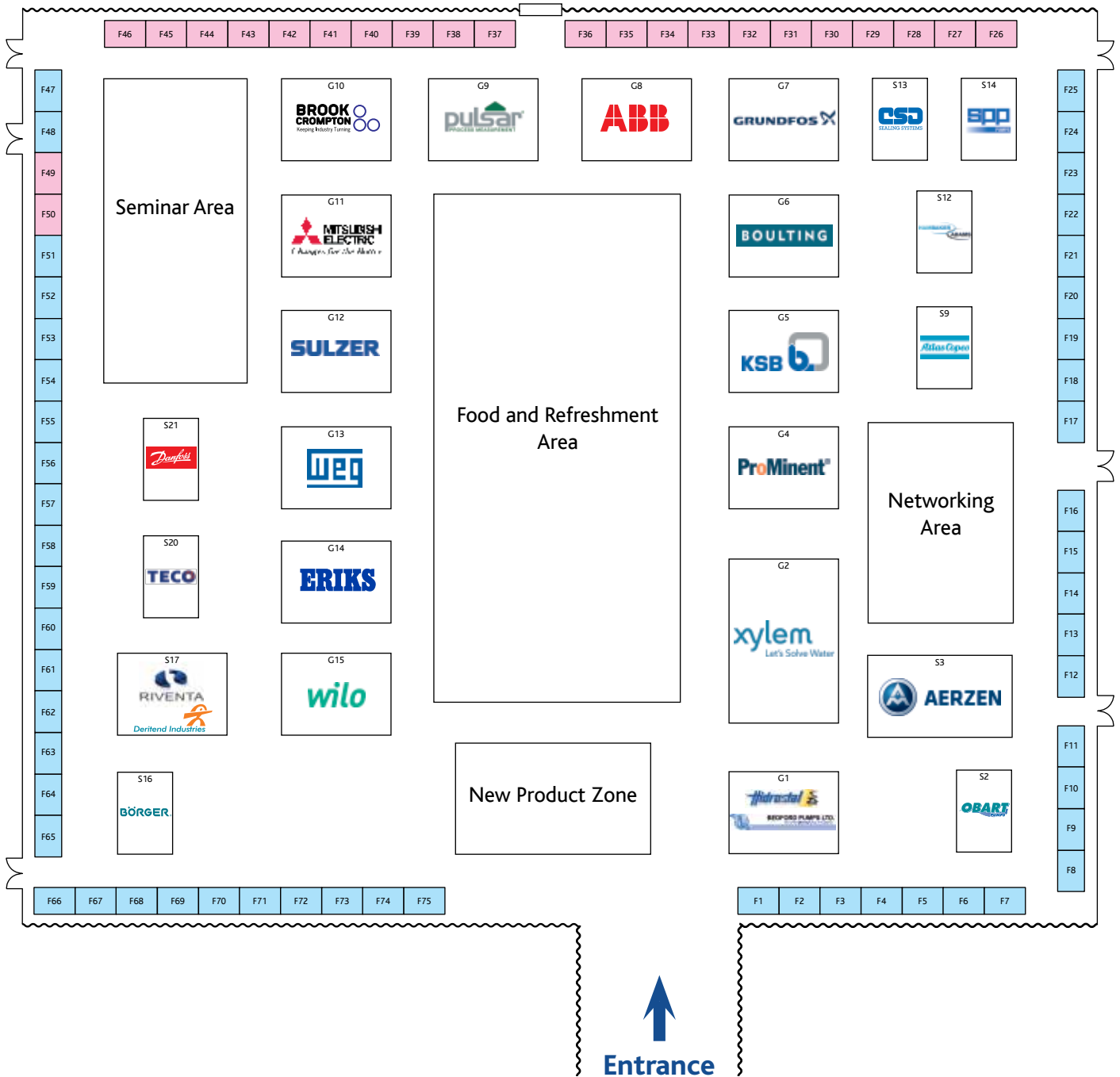
Or email: pumpcentre@esrtechnology.com and the link to the registration form will be emailed by return.

ce & Exhibition

Thursday, 12th May 2016 The International Centre, Telford



Exhibition floor plan



Exhibitor list

| | | | |
|-----------------------------|---------------------------------|-------------------------------|--------------------------------|
| BEDFORD & HIDROSTAL.....G1 | DANFOSS.....S21 | Still Available.....F26 | Still Available.....F50 |
| XYLEM.....G2 | HYDROMARQUE.....F1 & F2 | Still Available.....F27 | FLOTECH.....F51 & F52 |
| PROMINENT.....G4 | ROCKWELL AUTOMATION.....F3 | Still Available.....F28 | FAIRFORD ELECTRONICS.....F53 |
| KSB.....G5 | VERDER.....F4 | Still Available.....F29 | VOGELSANG.....F54 |
| BOULTING GROUP.....G6 | EMS INDUSTRIES.....F5 | Still Available.....F30 | IFM ELECTRONIC LTD.....F55 |
| GRUNDFOS.....G7 | ARTESIS.....F6 | Still Available.....F31 | ATG.....F56 |
| ABB.....G8 | SERA DOSING.....F7 | Still Available.....F32 | NORD GEAR.....F57 |
| PULSAR.....G9 | CEMA.....F8 & F9 | Still Available.....F33 | FILOFORM.....F58 |
| BROOK CROMPTON.....G10 | GILBERT GILKES & GORDON.....F10 | Still Available.....F34 | SMITH & LOVELESS.....F59 & F60 |
| MITSUBISHI.....G11 | LUTZ JESCO.....F11 | Still Available.....F35 | SEEPEX.....F61 |
| SULZER.....G12 | CHESTERTON.....F12 | Still Available.....F36 | KTR COUPLINGS.....F62 |
| WEG.....G13 | LUCY ELECTRIC.....F13 | Still Available.....F37 | EAGLEBURGMANN.....F63 |
| ERIKS.....G14 | KERRCO.....F14 | Still Available.....F38 | CAPRARI PUMPS.....F64 & 65 |
| WILO.....G15 | BLACKBURN STARLING.....F15 | Still Available.....F39 | I.MECH.E.....F66 |
| OBART PUMPS.....S2 | MAPAL GREEN ENERGY.....F16 | Still Available.....F40 | GRAPHALLOY.....F67 |
| AERZEN.....S3 | NOREVA.....F17 | Still Available.....F41 | BHR GROUP.....F68 |
| ATLAS COPCO.....S9 | REID.....F18 & F19 | Still Available.....F42 | FLOWCHECK.....F69 |
| HAM BAKER ADAMS.....S12 | T ALLEN ENGINEERING.....F20 | Still Available.....F43 | SAFTRONICS.....F70 |
| CSD SEALING SYSTEMS.....S13 | NETZSCH PUMPS.....F21 | Still Available.....F44 | SPX CLYDE UNION.....F71 |
| SPP.....S14 | INDUSTRIAL PUMPS.....F22 | Still Available.....F45 | ETATRON.....F72 & F73 |
| BORGER PUMPS.....S15 | EATON.....F23 | Still Available.....F46 | JACOBA.....F74 & F75 |
| RIVENTA & DERITEND.....S17 | QUARTZELEC.....F24 | Still Available.....F47 & F48 | |
| TECO.....S20 | TES NI.....F25 | Still Available.....F49 | |

What people say about the Conference

"We have been exhibiting at the Pump Centre exhibition for the past 6 years and have watched the event grow to become one of the largest UK Water and Waste Water exhibitions. This event attracts the right calibre of people and focuses on the right topics affecting the pumping industry. Because of the popularity of this exhibition we have decided to become a main sponsor".

"The Pump Centre event gave the opportunity for customers to see all of their suppliers in the large exhibition hall, and to see demonstrated the high level of collaboration in the supply chain who are working on behalf of the UK water industry".

"We were one of the original members of Pump Centre and we're very pleased to see that it's grown to be the UK's recognised number one".

"The Pump Centre Conference is the one time of the year when the whole water industry comes together. You can be guaranteed to see everybody you want to see in one place, on one day, and I think that's what makes it really strong".

"The conference today has been brilliant. We've met quite a few of the water company representatives – some that we haven't had any contact with before".

"It's the only conference that we do attend because the people coming to the conference are engineers and the services we provide are directed back to the engineers".

If you are interested in exhibiting!

**Contact: Jim Eaves on
07968 707753**

**More details available at
www.pumpcentre.com**

2016 Conference and Exhibition Innovative Pumping - Challenging the norm



Registration now open!

To be held on Thursday, 12 May 2016 at The International Centre, Telford, registration opens from 08:15.

Last year was a record attendance and we are expecting even more visitors this time so book early to make sure you don't miss out.

The 2016 Conference will have 25% more exhibition space and approaching 1000 attendees under one roof making it the ideal venue to meet industry experts and key players from across the supply chain – manufacturers, suppliers and users of pumps and ancillary equipment, services etc.

Full conference programme and 12 breakout sessions to choose from

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Saving by design

Many pump and indeed fan systems are designed with safety margins, and estimates which can make them grossly oversized, and they operate by resorting to the mainstay of lazy engineering, the variable speed drive.

This in turn can lead to inefficient use of energy, and while often the use of a variable speed drive can improve overall efficiency, it does not always help.



*Geof Brown - Pump Centre
Principal Consultant*

Of all the resources used in modern manufacturing, energy is arguably the most fundamental. This resource has long been taken for granted, but rising energy prices and concerns over greenhouse gas emissions are increasingly leading users to critically assess their energy usage.

In many technology areas, significant energy savings are difficult to achieve and gains of a couple of percent are then celebrated as breakthroughs, and a variable speed drive appears to offer universal savings.

The lack of system understanding

However, a lack of flexibility in the application of standards and a lack of understanding of energy efficiency may result in up to 90 percent of pumping installations being inefficiently sized, leading to energy waste.

Systems using the same pump and maximum output can have very different characteristics, one with a high static head and low friction will operate very differently to a system with low static and high friction.

This may sound very obvious, but it is a trap that some specifiers fall into regularly. They tend to work on the assumption that the affinity laws hold good in all circumstances, while in fact they only hold truly for systems with high friction.

In this situation the pump works at a near constant efficiency, volume proportional to rotational speed, head proportional to speed squared and energy consumed proportional to speed cubed – these conditions only exist in very few sites, although in centrifugal fan applications it is the majority of sites.

If we examine the case of a high static, low friction system a very slight speed variation can cause a large change of duty, but can also push the system efficiency lower.

Current legislation forces one into using high efficiency systems, whereas this is not really justified for infrequently used installations, such as fire pumps and even storm water pumps, where reliability is the principle that should influence selection.

It is also a fact that a fixed speed pump with high efficiency motor will have a substantially lower energy input of between 2 and 3%, than a converter fed system at the same duty. The moral should be, use fixed speed when possible and consider the running hours.

Why systems get over dimensioned

To illustrate the problem faced by system design engineers, when planning a system, there is a degree of uncertainty as to the shape of the system curves (friction, pipe cross section changes and the number of bends in the final pipe layout all take their toll).

These factors all add to the risk that the anticipated operating conditions will not be met.

There are three basic ways to address the changed operating conditions:

- If the changed condition is permanent, and substantial, then the pump size should be changed to match the load.
 - This may add to the installation cost
- The pump base speed can be changed, or the impeller can be modified.
- A throttling device (such as a valve, or orifice plate) can be added.
 - Both of these options can waste energy.

For clean water applications, energy cost typically amount to around 94% or 95% of the operational costs for a pump installation, compared to around 2% to 3% each for maintenance and investment.

The cost of energy is therefore the dominant part of the lifecycle cost of a pump and energy consumption is the best place for optimization to start.

Despite careful analysis and design, many systems do not operate optimally. One reason is that many systems are simply sized too large to start with, resulting in higher operating and investment cost.

Systems get oversized throughout the design process, but variable speed drives can be used to conserve energy. If a system operates in a dry weather situation for most of its life, and is limited to a duty/standby system, and has to cope with storm conditions very occasionally, why not design for normal running and best efficiency around dry weather flow. Storm flow can still be handled, but by over speeding, or possibly even with tandem motors.

This may not meet the clients' standards, which were probably written for fixed speed systems, but could result in reduced energy consumption, it does not mean that variable speed dry weather, and fixed speed storm pumps would not prove a better option.

Other ways of exploiting variable speed drives

Modern drives have a number of features that can be exploited to render their use justifiable for other reasons than variation of speed. These should also be considered when designing an installation, as they may result in a cost saving.

Running a pump at for prolonged periods at reduced speed can reduce wear, and therefore maintenance and increase lubrication intervals.

They normally provide the softest start of all forms of motor starting, drawing only the active power required from the network.

They also give controlled run up with potentially more than a single ramp rate, potentially ideal for a borehole pump needing to lubricate the intermediate bearings quickly.

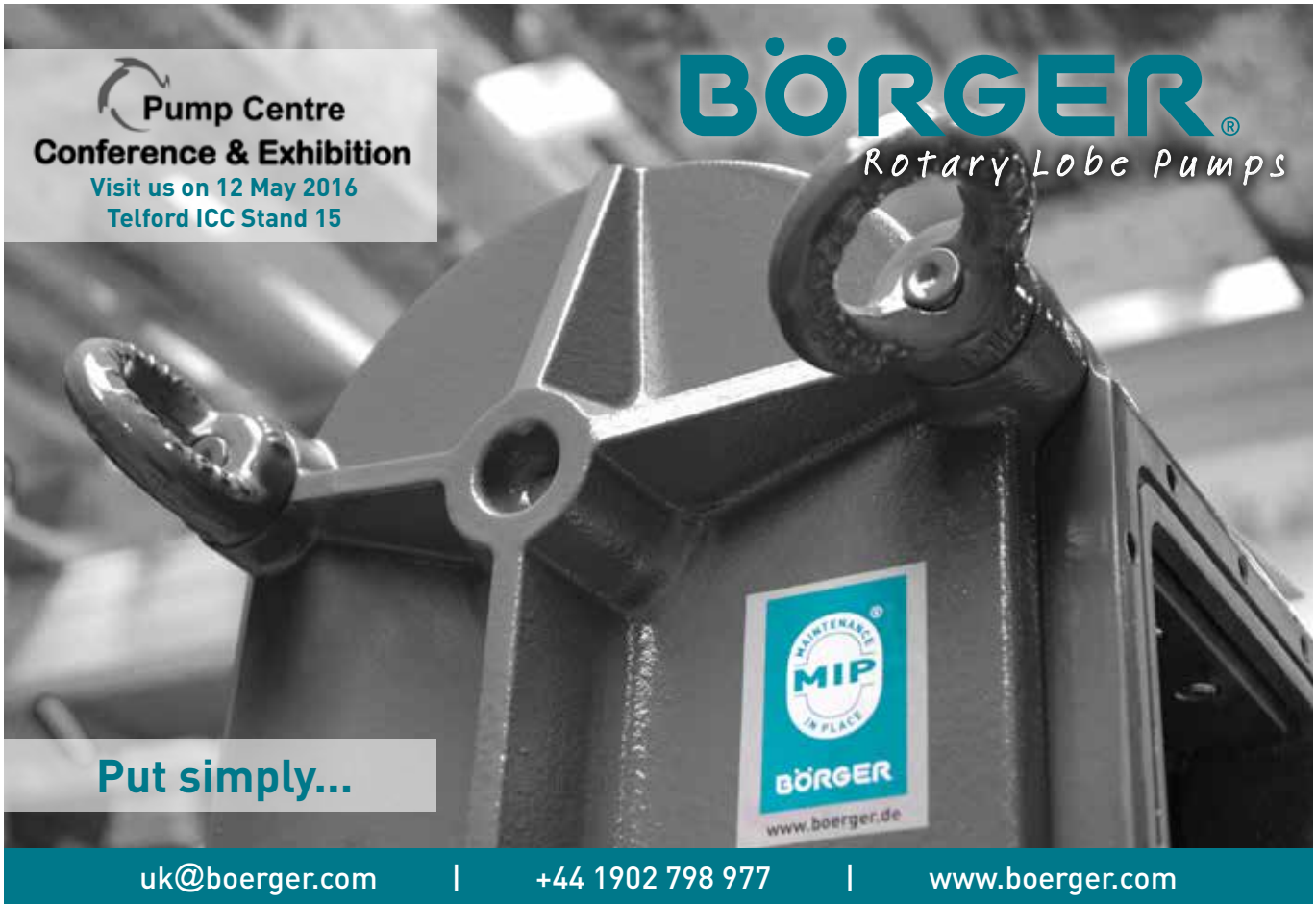
Drive manufacturers also can add useful software, such as de-ragging applications where one way of implementing is that the drive looks at the power required at a specific speed, and if it rises above a trigger level, it will cause the pump to be reversed to hopefully throw of the blocking material. A further software looks for the power changes when sedimentation occurs in a discharge main, causing a short burst at higher speed to clear the deposit.

Many drives now feature an active rectifier, which has some features that can be utilized, for bi-directional power flow, for example to allow braking to allow a fluid column to be dispersed under control, or even to connect a pump as a water turbine to generate saleable energy to the network.

The active rectifier also reduces the harmful low order harmonics on the network and can be used to control the power factor.

For these reasons many variable speed drives can be seen used to actually save on capital cost, with typically smaller transformers and cabling. These in turn help in reducing standing losses on the system.

The old mantra that variable speed saves money may only be applicable in a limited number of cases, but a fully costed system can show savings from unexpected quarters.



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Hidrostal's pumps remain blockage free since 1960

Many pump manufacturers lay claim to the fact that their pumps are non-clog. Innovative designs with improved capabilities are launched periodically across the industry. They promise more and more, but do they really deliver?

Hidrostal, the renowned Swiss pump manufacturer, has been producing non clog pumps since its inception. The patented single screw centrifugal impeller was invented by its founder Martin Stähle in 1960, and this unique impeller incorporates an exceptionally large free passage which ensures that its ability to pump raw unscreened sewage is second to none.



Hidrostal's free ball passage

Free ball passage has always been the traditional measure of a pumps ability to handle solids without blocking. Despite recent trends and "innovative" designs, this concept remains the most vital component of a non-clog pump.

A large free ball passage in the impeller will trap less rag or fibre and pass large objects with ease. The consistency of sewage can be infinitely variable and hard to predict, but free passage will ensure that whether the blockage is hard or soft it will not clog. The photo below shows a collection of objects which passed through Hidrostal's raw sewage inlet pumps at Ness Point and collected in the grit screen.

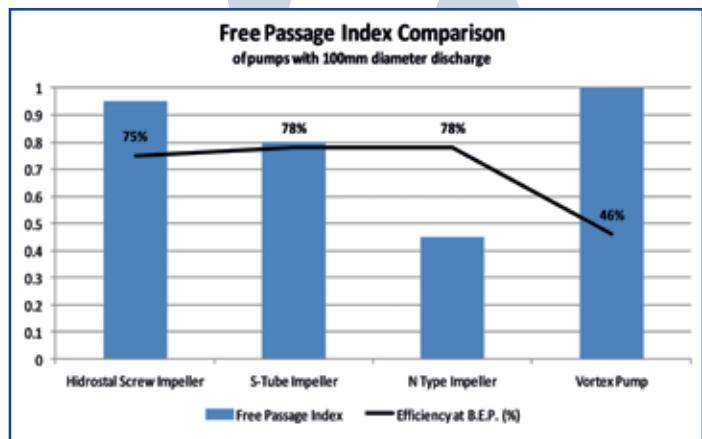
Without sufficient free passage these items would either block the pump or remain in the sump gathering rags around them.



Hidrostal's pumps pass an infinite variety of solids

Measuring the proportion of space through which solids can pass, relative to the discharge size of a pump, (referred to as the Free Passage Index) will guide a prospective buyer through the differing range of pumps in the market place.

A Hidrostal hydraulic guarantees the highest average Free Passage Index (FPI) at 0.88 on pumps between 80-200mm discharge size (a totally unimpinged passage would carry an index of 1). On pumps above 200mm discharge the Hidrostal FPI widens evens further compared to other centrifugal solid handling designs. Moreover this is coupled with an excellent efficiency of up to 84%. The only other



type of pump which could achieve a similar FPI index is the Vortex design, but this would be at a very poor efficiency.

Hidrostal Ltd, the UK distributor for the Swiss manufacturer, has been successfully installing pumps containing the revered single vane screw impeller into the UK market for almost 40 years. The design has been proven worldwide since 1960 and incidentally takes inspiration from the original Archimedes screw, a pump that has been successful in the market place for over 2000 years.

In essence Hidrostal's pumps are working as well on today's sewage as they did on yesterday's, setting and maintaining the standard with their winning formula of the highest Free Passage Index combined with optimum impeller geometry. Furthermore installing a Hidrostal pump will also be a key contributing factor to delivering Totex by reducing operational callouts to blocking pumping stations, thus ensuring a True Life Cost outcome.

www.hidrostal.co.uk



Protecting your assets

For water service companies, ensuring that wastewater treatment works are fully operational is a key aim and one that can be severely disrupted if vital assets are damaged by debris.

Finding that an expensive pump has been wrecked by debris is one of the worst scenarios. The main defence against such damage is upstream protection. And with pumps costing up to of £200,000 unsurprisingly this is a strong market.

The ideal way to protect wastewater treatment works equipment is by installing trash rakes, which remove debris from the coarse bar screens before any damage occurs. The Bosker trash rake from Jacopa is an ideal solution to all these issues, performing the work of a trash rake, conveyor and debris loading system in one to substantially reduce costs.

Bosker solutions have low operation and maintenance costs and as a first line of defence for pumps, screens and associated treatment processes, the trash rakes are a robust and effective solution to one of the industry's most pressing issues.

Bosker has been designing, building and installing its beautifully engineered, ultra-reliable trash rakes since the 1960s and is the most experienced producer of this type of equipment globally. Bosker trash rakes can be found at larger pumping stations, wastewater treatment works and water intakes, and their 1100 installations are testament to their reliability and robustness.

Jacopa offers full UK and Ireland coverage, and fully trained engineers to design, supply and install new equipment as well as assessment and repair of existing Bosker installations and production of condition reports if required. The company has a dedicated, specialist Bosker team at its West Bromwich facility, and guarantees OEM parts for every parts order or refurbishment.

Visitors to this year's conference will be able to see the very latest technology from Bosker in the New Product Zone.

www.jacopa.com

Meeting compliance on effluent for every size of business

For many small to medium-sized businesses, obtaining a dosing solution to ensure the effluent produced by their processes is a financial obstacle and can place demand on engineering staff to maintain and monitor the performance to meet compliance of environmental directives. Now available from LHoist and Verder is a combined dosing solution that is cost-effective for small producers and secures a dosing operation for large-scale operators in the event of a major breakdown.

The accurate and consistent dosing of chemicals in wastewater treatment requires a pump technology that delivers the chemicals in a manner that optimises their usage and effectiveness. A chemical dosing skid employing either peristaltic or metering pumps attached to pipework built into a cabinet containing a dedicated control system provides the most effective solution for this process.

The effectiveness of the dosing system is all-important, for when wastewater is being discharged from a plant it must comply with all relevant environmental regulations and standards. The Water Industry Act of 1991 states that any liquid



effective approach to the provision and application of this liquid lime product.

LHoist and Verder

"Neutralac® SLS45 is a 45% strength liquid lime developed specifically to have a low viscosity, low settlement rate and high reactivity due to its high strength," reports Xavier Mear, LHoist's Neutralac specialist. *"It is highly proficient at neutralising acid-based effluents, maintaining a steady pH and removing heavy metals, precipitating sulphate, phosphate and fluoride as well as treating fat, oil and greases."* According to LHoist it offers both significant technical and economical benefits, being an alternative to powdered lime, caustic soda and magnesium hydroxide slurries. It delivers more efficient operation of the treatment plant and greatly reduces costs as it is a single ready-to-use reagent. Neutralac® lends itself to dosing using peristaltic pumps, making it a perfect fit for Verder's proven chemical dosing packages.

Neutralac® SLS45 is manufactured at the LHoist plant in Buxton where there is very pure limestone. *"It is used for industrial effluent, wastewater treatment, sludge treatment, food waste treatment and for increasing pH in digested sludge for agricultural uses,"* continues Mear. *"Furthermore, being a suspension the most appropriate pumping technology is the peristaltic pump."*

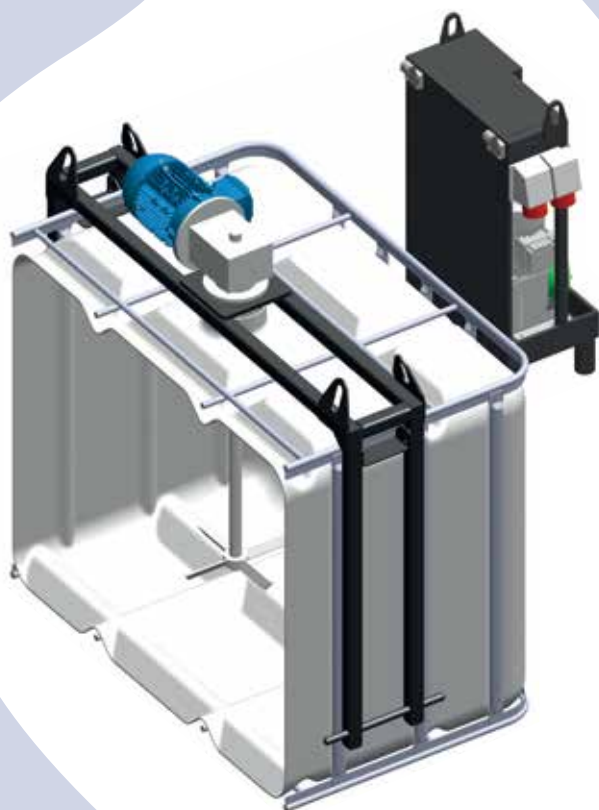
Verder has been building and supplying chemical dosing packages to wastewater treatment plants in a great range of industry sectors around the world for many years. The collaborative approach adopted by Verder and LHoist identified the Dura skid-mounted system as being a suitable vehicle for demonstrating the effectiveness of Neutralac® SLS45 to potential customers.

Verder's small-scale dosing rigs connected to IBCs tend to operate at low dosing rates around 20lt/hr and the integrated package is designed around the Dura peristaltic pump. The Dura hose pump is a close-coupled compact pump offering flow rates of between 1lt/hr and 15.3m³/hr and pressures from 8bar to 16bar and is the perfect choice for this dosing package. Typically the Dura dosing package comes with a Verderflex Dura peristaltic pump, pH monitor, control electronics, agitator for an IBC and any necessary pipework connections. Being lightweight, it is an easily transportable system that is ideal for temporary small-scale pilot applications. However, it is suitably robust to meet the demands of challenging environments, which is another reason why it appealed to LHoist.

On trial

Introducing a new and innovative product into an established and rather conservative market is always a challenge, and for LHoist the initial challenge was to convince potential Neutralac® SLS45 customers of its benefits. *"LHoist offer the rig as part of a risk-free trial, and we are running it alongside existing systems so that comparisons can be made,"* says Mear. *"If the trial is to be paused, then the customer can simply switch over to their existing system. Most customers see the rig as impressive. Feedback indicates that Neutralac® SLS45 is a far more effective product for enhanced flocculation, pH control, improved removal of heavy metals and COD level."*

LHoist recognised that instead of installing a pump on a floor and attaching it



produced wholly or in part from any trade or business activity carried out on trade premises qualifies as trade effluent and therefore requires consent from a utility company. Trade effluent control applies to all businesses from large multinationals to small and medium-sized enterprises.

The main effluent treatment methods employ the precipitation of impurities, separation of solids from the liquid and pH adjustment. Non-compliance with effluent waste consent levels inevitably causes high levels of pollution and can result in prosecution, fines and even the closing down of plants. There are several types of reagents that can be used in the various stages of wastewater treatment; the most commonly used being lime, caustic soda, sodium hypochlorite, polymers and magnesium hydroxide.

To be truly effective, these reagents need to be dosed exactly, either in continuous or in batch processes. The flow of effluent may impact on the rate at which a reagent will need to be added. This is best managed by the use of a purpose-built chemical dosing system, a fact clearly appreciated by LHoist, the UK-based manufacturers of Neutralac® SLS45, which has established an informal relationship with Verder Pumps. This relationship offers an innovative and cost-

to an IBC, it was more cost-effective to integrate all the elements in a single, compact rig. There was also the issue that in many instances robust industrial peristaltic pumps would be needed as they could be exposed to the elements, or operate in confined and environmentally challenging areas. LHoist had identified what they needed and that is what Verder could provide. Not only that, Verder could provide a complete package that offered the flexibility to satisfy the requirements of sites where both low dosage from IBCs was needed or for continuous operations typically encountered at much larger sites.

Why Neutralac® SLS45?

Cost-effective - Neutralac® SLS45 has replaced both traditional water treatment agents such as magnesium hydroxide and caustic soda with a single chemical.

Meet compliance easier – Helps your process be compliant with environmental directives thanks to the high reactivity rate, so effluent can be returned to the water course.

Easy and safe to use - This is due to the low abrasion of lime over magnesium hydroxide and it is less corrosive than sodium hydroxide/ caustic soda. With a low settling rate, the product remains in suspension with less agitation, reducing the cost of energy and maintenance of storage vessels.

Support - LHoist provide ready technical assistance with the handling and dosage of Neutralac® SLS45 into effluent streams, assistance with trials in your process and delivery of the chemical both in IBC and bulk purchase.

Where has Neutralac® SLS45 been used?

- Users in sewage treatment, AD & Biogas sites, food production, metals finishing, heavy industry and many other sectors of industry, in fact virtually any effluent stream requiring neutralization and/or pH correction.
- Transport distribution depots to treat surface run-off containing fuel oils, trace metals and accumulated sludge from vehicle cleaning procedures.
- Effluent from food production such as pet food, dairy, instant coffee, abattoirs or fried potato products where mixes of oils, starches, fats are handled.
- Treatment of waste water sludge at STW including digested liquid sludge, a process required to meet the bacteriological and odour control standards stipulated by the environment agency.
- In anaerobic digestion facilities, where effluent is treated prior to the AD process. Neutralac® SLS45 not only treated the effluent, it increased the biogas yield via enhanced enzymatic digestibility.

The Verder connection

The Verder connection came about back in 2013 when LHoist needed a dosing system incorporating storage facilities, electronic control and instrumentation that could accurately deliver Neutralac® SLS45. All companies discharging wastewater have to control the pH content at the point of discharge. Other considerations include BOD, COD and heavy metals. *"The majority of the potential users for our product have their own treatment plants on site and are very much aware of discharge consent levels,"* says Mear. *"It is companies that are experiencing issues with existing caustic or lime dosing systems that are contacting us. In many existing plants the dosing technology is outdated or possibly not functioning as well as expected, which is why we are replacing an existing system with Neutralac® SLS45 and a highly effective dosing system."*



This is where the trials unit comes into its own. *"In our opinion the Verder rig provides better dosing control with a peristaltic pump, coupled with better pH control by using a high specification pH controller,"* comments Mear. This is generally better than the equipment that their customers may have been running for many years. One of the reasons why we work with Verder is that the pump company is very accommodating and cooperative.

When approached for a trial pump to go onsite and the application is outside the range of the small unit, Verder is prepared to lend pumps for specific applications. Although LHoist says that they tend not to get much feedback on the pumps, they do get positive comments on how impressed they are with the rigs.

Markets for Neutralac® SLS45 and Verder

Using lime is an old technology but still extensively used in the water treatment, metals production, food processing, chemicals processing and surface finishing industries, to name just a few. There are many companies still using caustic soda where a simple diaphragm pump will suffice, but this and other alkali alternatives do present more of a safety problem where ageing dosing systems tend to show wear and lack true dosing accuracy when handling liquid lime.

"Many older dosing systems use fixed speed pumps and are inefficient when there is not a requirement for continuous dosing," explains Mear. *"The Verder peristaltic pump is accurate, energy efficient, very reliable and is easy to speed up and slow down as circumstances demand and will follow a pH variation very easily. In addition, it is simple to operate and maintain."*

It is older sites where investment in dosing systems has been held back which offer the greatest opportunities for LHoist to demonstrate the effectiveness of their products in conjunction with the Verder rigs. As effluent treatment is not necessarily a profit-making activity for many companies there is understandable reluctance to invest capital in new equipment. However, when it is pointed out that by changing to Neutralac® SLS45 and using an efficient dosing system, considerable savings can be made, and that the risks of breaking consent levels and any subsequent fines are eliminated, opinions change.

Although designed for trial purposes, the rigs built by Verder are rugged and use materials and pumps that have a proven track record of operating in harsh conditions over long periods. Thus, if a trial user wants to keep the rig at the end of the set period, it does not need to be removed. LHoist and Verder will tailor rigs to meet the exact requirements of the customer once the rig is taken as a permanent fixture. Alternatively, LHoist will undertake a site survey with additional engineering consultancy provided by Verder when a rig is being installed.

The enthusiasm for Neutralac® SLS45 and Verder Dura dosing rigs is reflected in the growing take up by a broad spectrum of industry sectors, with many customers asking for trial rigs to be left as permanent installations. To accommodate this, LHoist offers end-users the option to either purchase the rig or enter into a rental agreement, which also includes the regular supply of its product.

"We consider that renting it is a good option for SMEs as there is only a small monthly cost and Neutralac® SLS45 can often be cheaper than the alkali that is currently being used," says Mear. *"There is considerable interest in renting out a unit that provides the benefits of a lime-based product. Moving the capital investment cost over to a small monthly cost is very attractive."*

www.verder.co.uk

Technologies for High Efficient Electric Motors



W22 Super Premium Motors - offer the highest efficiency for fixed-speed applications. Compared to IE3 motors, IE4 motors can achieve a reduction in energy losses ranging from 10% to 24%. IEC is also envisaging a higher IE5 efficiency level in the future that is expected to have approximately 20% less losses than the IE4 level. However, when fed by frequency converters, they present a significant decrease in their efficiency, even in constant torque applications. In some applications, they may also need to be over dimensioned or equipped with forced ventilation.

Significant advances in the power electronics and control techniques have led to an increasing use of VSDs as a way of increasing energy efficiencies in fluid-flow applications. With applications that require variable speeds, PM motors and synchronous reluctance motors can deliver IE4 or even higher efficiency levels in the same frame sizes as induction motors. In particular, WMagnet IE4 PM motors can be up to two frame sizes smaller than induction and reluctance motors, while WMagnet IE5

Motors play a key role in improving energy efficiency in fluid-flow applications, including pumps, compressors and blowers. Induction motors remain the most popular for such applications, but permanent magnet (PM) and switched/synchronous reluctance motor technologies are increasing their market share. In this article, Siegfried Kreuzfeld, Managing Director at WEG Motors, Jaraguá do Sul - SC, Brazil, compares the three motor technologies and discusses how they can contribute to increasing energy efficiency in pumping systems.

A range of motor technologies are currently available on the market - from the most affordable to the most efficient or compact. Depending on the application, motors will have to meet a variety of specific requirements, including speed range, installation, safety, reliability, low noise and vibration levels, durability and maintenance. However, induction motors remain the most widely used, especially when variable speed is not required.

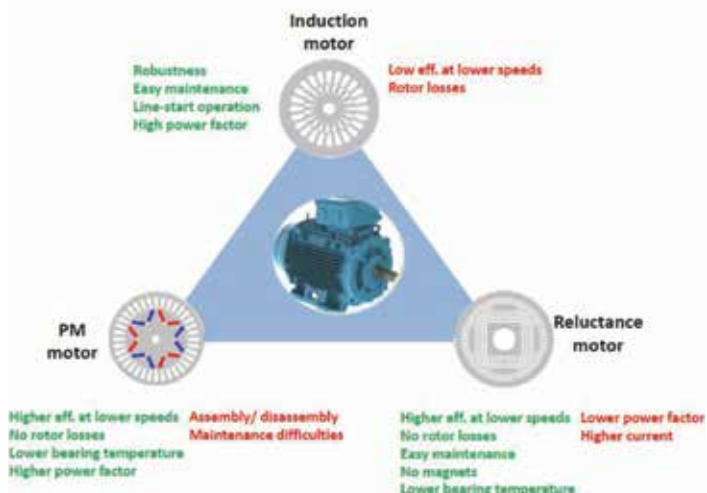
One reason for the popularity of induction motors is their robustness, reliability and easy operation. They can be connected to the mains and do not require power electronics. The recently introduced IE4 induction motors – including WEG's

PM motors can be in the same frame sizes as induction motors, but weigh less, because they contain less active material.

Thus, PM motors can contribute to increasing process efficiency, because they deliver higher efficiency than induction motors at low speeds and do not need over dimensioning or forced ventilation. Additionally, this motor technology offers high torque-to-current and torque-to-volume ratios, compactness, and fast dynamic response. PM motors also present the highest efficiency of all motors with high power factor, due to the absence of joule losses in the rotor and the excitation flux of the permanent magnets. All these advantages have led to a significant increase in the use of PM motors in a variety of applications - from appliances (washing machines) to industrial drives (compressors, pumps and blowers), servo drives and electric vehicles. However, PM motors have a higher capital cost compared to induction motors because they are equipped with rare-earth permanent magnets. Ferrite magnets could be used in low power applications where low cost is mandatory.

When compared to induction and PM motors, switched reluctance motors have concentrated windings in the stator and laminated steel with salient teeth in the rotor, with no aluminium cage or permanent magnets. One clear benefit of this design is that – similar to PM motors – this motor technology ensures no joule losses in the rotor. Additionally – similar to induction motors – switched reluctance motors offer mechanical simplicity, robustness and reliability. However, they require more sophisticated electronic control than induction motors. These characteristics make them particularly suitable for a variety of applications - from appliances and industrial drives to electric vehicles. Switched reluctance motors are also well suited for wide speed ranges and high speed operation, including compressors and machine tools. For such applications, these motors could offer higher efficiency and power density than induction motors of equivalent power. However, their significant torque ripple could translate into high vibration and acoustic noise.

Contrary to switched reluctance motors, synchronous reluctance motors can be more easily designed to give reduced levels of torque ripple and acoustic noise and sinewave ac operation (rotating field). These motors use a conventional polyphase ac stator and their rotor features flux barriers rather than an aluminium cage or permanent magnets. Given these characteristics, synchronous reluctance motors – which are electronically controlled - can be used in a wide range of



industrial and commercial applications where variable speed is needed. Similar to switched reluctance motors, they are well suited for wide speed ranges. However, maximum speed operation and motor performance is greatly dependent on the geometry of the flux barriers in the rotor lamination.

These motors are attractive because the cost of active material is comparable to that of induction motors and lower than that of high energy PM motors. Additionally, these motors offer easiness of rotor skewing, flux weakening capability (which is important for attaining high speed ranges) and suitability to large overloads. Synchronous reluctance motors can achieve similar energy efficiency levels to those of induction motor, however their power factor is relatively poor, with current being up to 40% higher than in an equivalent induction motor.

In conclusion, determining which motor technology is the best for a particular application depends on a variety of factors including cost, size and weight, reliability, speed range, noise, vibration, easiness of maintenance and general performance. However, when it comes to energy efficiency, PM motors have the best performance, because they do not present losses

in the rotor and, therefore, offer higher efficiency at low frequencies for constant torque. Synchronous reluctance motors can also achieve IE4 efficiency but with higher current and lower power factor, which can affect size and cost of the drive. Nevertheless, induction motors, when properly designed and manufactured can also reach IE4 efficiency levels, enabling engineers to increase energy efficiencies of their drive systems, meeting and exceeding current legislation.

www.weg.net/uk



Automated Technology Group bespoke 3.3KV MCC for Bransholme SWPS

Leading power and controls solutions supplier, The Automated Technology Group, worked with Yorkshire Water to help deliver the new £16M screw pump station replacing the existing Bransholme Surface Water Pumping Station (SWPS), located north of Kingston upon Hull.

The new facility is capable of pumping four tonnes of water per second – the equivalent of filling an Olympic-sized swimming pool every two minutes – through a new system of storm screw pumps constructed in the east corner of the Bransholme Lagoon adjacent to the existing lagoon.

Having unrivalled expertise in water and wastewater schemes, The Automated Technology Group was employed to design, manufacture, test, install and commission a 3.3KV Motor Control Centre utilising six Korndorffer Auto-Transformer Motor Starters to supply power to the new storm pumps.

The Automated Technology Group, which is now a Wood Group Mustang company, is proud to have been involved in this important project, providing Yorkshire Water a bespoke power solution to support the new facility.

www.atg.gb.com

The Lifting Trade Embrace Waste Water Industry Challenges

The lifting Equipment Engineers Association (LEEAA) recently held a working group event to understand the challenges Utility companies have with the lifting of submersible pumps.

LEEAA members had raised issues with the varying chain specifications and different ways written schemes of examination were being used by water companies.

Representations from Yorkshire Water, Welsh Water, Thames Water, Severn Trent, Southern Water, Untied Utilities, Scottish Water were in attendance. Also LEEAA members William Hackett Lifting Products, Brindley Chains, T.Allen Engineering, Lloyds British Group, GAP Lifting, Speedy Lifting, Bickers Lifting, FLG Group, Catena and Delphini attended. The pump manufacturers also had attendees from Xylem and KSB with the Insurance companies being represented from Applus Velosi and RSA.

LEEAA highlighted to the delegates, their members concerns about the use of harmonised standards to specify products when they are not intended for use in waste water environments. They also raised the concerns HSE have when using a Written Scheme to extend examination periods based on cost saving at the risk

to safety. On the subject of written schemes the HSE have clearly stated that, 'if following a risk assessment an employer chooses to carry out substandard examinations and run potentially defective equipment, then the HSE would consider this as putting profit before safety'. They added, 'any duty holder caught doing this would be held accountable by the HSE.'

Debate between the utility companies was varied and highlighted the misunderstanding of lifting regulations and specifications and a short fall in understanding who are the duty holders and where the responsibility for lifting lies within the law.

The LEEAA working group will bring together a set of guidance documents to cover lifting specifications for procurement, written schemes of examination, scopes of examination, selection of equipment and care and maintenance, along with guidance on the law and its impact of duty holders.

The Pump Centre offered to support efforts to promote these documents to a wider audience.

www.leeaint.com

The Pump Centre's training programme for 2016 has been fully restructured. We are introducing a number of new training courses, trainers and venues.

We now have a new flagship three day pumps course entitled Pumps and Pumping Systems. The first day of the course starts as an introduction to pumps and builds through the second and third days to cover more advanced topics. This training course as with most of our other courses will be held at two main UK venues – one in Warrington in North West, England and the other in Reading, in the South East. Other new courses titles for 2016 include:

- Introduction to the Water Treatment Process
- Introduction to the Wastewater Treatment Process
- Sewage Pumping Station Design
- Effective Presentations Skills
- Pumps and Pumping Systems – for non-engineers

The next 12 months will be an exciting time for our training programme and other new titles will be added during the year. If you would like to be put onto our mailing list please contact Jim Eaves jim.eaves@esrtechnology.com

Also for more information please visit our website – www.pumpcentre.com



| Title | Date | Full Price | Members Price |
|--|------------------|------------|---------------|
| Centrifugal Pump Repair Awareness Day | 1 March 16 | £120 + VAT | £96 + VAT |
| Centrifugal Pump Repair Awareness Day | 3 March 16 | £120 + VAT | £96 + VAT |
| Sewage Pumping Station Design (Reading) | 8 March 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Introduction (Warrington) | 15 March 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Intermediate (Warrington) | 16 March 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Advanced (Warrington) | 17 March 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Introduction, Intermediate & Advanced (Warrington) | 15 – 17 March 16 | £795 + VAT | £556 + VAT |
| Effective Presentation Skills (Reading) | 5 April 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Non Engineers (Warrington) | 12 April 16 | £350 + VAT | £245 + VAT |
| Introduction to the Water Treatment Process (Warrington) | 19 April 16 | £350 + VAT | £245 + VAT |
| WIMES Awareness Day (Reading) | 19 April 16 | £120 + VAT | £96 + VAT |
| Introduction to the sewage Treatment Process (Warrington) | 20 April 16 | £350 + VAT | £245 + VAT |
| Conference & Exhibition 2016 | 12 May 16 | FREE | |
| Pumps & Pumping Systems – Introduction (Reading) | 24 May 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Intermediate (Reading) | 25 May 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Advanced (Reading) | 26 May 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Introduction, Intermediate & Advanced (Reading) | 24 – 26 May 16 | £795 + VAT | £556 + VAT |
| Pumping in the Water Industry – 4.5 days (Warrington) | May 16 | £995 + VAT | £696 + VAT |

| Title | Date | Full Price | Members Price |
|--|----------------------|------------|---------------|
| Introduction to the Water Treatment Process (Warrington) | 7 June 16 | £350 + VAT | £245 + VAT |
| Introduction to the Sewage Treatment Process (Warrington) | 8 June 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Non Engineers (Reading) | 14 June 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Introduction (Warrington) | 13 September 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Intermediate (Warrington) | 14 September 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Advanced (Warrington) | 15 September 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Introduction, Intermediate & Advanced (Warrington) | 13 – 15 September 16 | £795 + VAT | £556 + VAT |
| Sewage Pumping Station Design (Warrington) | 20 September 16 | £350 + VAT | £245 + VAT |
| Pumping in the Water Industry – 4.5 days (Reading) | 26 – 30 September 16 | £995 + VAT | £696 + VAT |
| WIMES Awareness Day (Warrington) | October 16 | £120 + VAT | £96 + VAT |
| Scottish Conference Mini Conference | 6 October 16 | £120 + VAT | £96 + VAT |
| Waste Water Screening & Preliminary Treatment (Warrington) | 12 October 16 | £350 + VAT | £245 + VAT |
| Compressors Awareness Day | 17 October 16 | £120 + VAT | £96 + VAT |
| Positive Displacement Pumps – Holiday Inn Washington | 20 October 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Introduction (Reading) | 1 November 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Intermediate (Reading) | 2 November 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Advanced (Reading) | 3 November 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Introduction, Intermediate & Advanced (Reading) | 1 – 3 November 16 | £795 + VAT | £556 + VAT |
| Social Media Awareness Day (Warrington) | 8 November 16 | £120 + VAT | £96 + VAT |
| Principles of Electric Motors & Drives (Reading) | 9 November 16 | £350 + VAT | £245 + VAT |
| Pumps & Pumping Systems – Non Engineers (Warrington) | 10 November 16 | £350 + VAT | £245 + VAT |
| Introduction to Rolling Element Bearings (Warrington) | 15 November 16 | £350 + VAT | £245 + VAT |
| Pump Maintenance (Warrington) | 16 November 16 | £350 + VAT | £245 + VAT |
| Why Mechanical Seals Fail (Warrington) | 17 November 16 | £350 + VAT | £245 + VAT |
| Pumping in the Water Industry 4.5 days (Warrington) | 21 – 25 November 16 | £995 + VAT | £696 + VAT |
| Introduction to Valves (Warrington) | 6 December 16 | £350 + VAT | £245 + VAT |

(Awareness Days are highlighted in red).

Pump Centre members receive 30% discount off training courses and 20% discount off Awareness Days

All courses (unless indicated) will be held at:

All Reading courses will be held at: Best Western Calcot Hotel, Reading, RG31 7QN

All Warrington courses will be held at: The Lymm Hotel, Warrington, Cheshire, WA13 9AQ

The majority of our training courses can be run "In-House" at a venue selected by the Client. In-house courses become cost effective when clients have 8 or more members of staff to be trained. Please contact the Pump Centre for a quote.

To discuss your training requirements contact:

Jim Eaves: 07968 707753 or email jim.eaves@esrtechnology.com

To reserve your places contact:

Karen Bridgeman: 01925 843512 or email

karen.bridgeman@esrtechnology.com

For more training information visit www.pumpcentre.com

DESIGNED FOR WHEN YOU KNOW WHAT YOU'RE PUMPING... AND WHEN YOU DON'T



PORTABLE PUMPS



LSC1.4S puddle sucker
110V/230V
170 LPM x 11 MTRS.



LB 2" contractors
110V/230V
up to 310 LPM & 15 MTRS



HS 2" & 3" contractors
110V/230V
up to 310 LPM & 18 MTRS



HD 3" large volume
110V/230V
830 LPM & 10 MTRS



WX/WB 1" to 4" centrifugals
Honda
up to 1800 LPM & 40 MTRS



DIAPHRAGM petrol & diesel
Honda & Yanmar
up to 330 LPM & 18 MTRS

PROJECT DEWATERING



KTV/KTVE 3PH contractors
0.75kW - 5.5kW
up to 980 LPM & 35 MTRS



KTZ/KTZE 3PH contractors
1.5kW - 11kW
up to 2440 LPM & 49 MTRS



KST 3PH drainers
0.40kW - 7.5kW
up to 1600 LPM & 25 MTRS



KRS 3PH large volume contractors
3kW - 22kW
up to 12,000 LPM & 34 MTRS



LHW/LH 3PH high head contractors
3kW - 110kW
up to 6500 LPM & 216 MTRS

SAND PUMPS



KTV2/KTD 3PH portable with agitator
2kW - 3kW
up to 800 LPM & 23 MTRS



KRS2 3PH 4 pole with agitator
4kW - 9kW
up to 3200 LPM & 22 MTRS



NKZ3 3PH 4 pole with agitator
2.2kW - 11kW
up to 2440 LPM & 28 MTRS



GPN 3PH 4 pole with agitator
5.5kW - 22kW
up to 5000 LPM & 30 MTRS

CUTTER & PUMPS



DSK 1PH & 3PH cutters
0.75kW - 1.5kW
up to 700 LPM & 15 MTRS



GD 1PH & 3PH grinders
1.1kW - 1.5kW
up to 180 LPM & 25 MTRS

SEWAGE PUMPS



PU/PUA 1PH & 3PH vortex
35mm passage 0.4kW-1.5kW
Up to 800 LPM & 16 MTRS



BCV 1PH & 3PH vortex
50 to 80mm passage 0.4kW-3.7kW
Up to 1500 LPM & 16 MTRS



U/UZ 3PH vortex
46 to 100mm passage 0.75kW - 11kW
Up to 2600 LPM & 23 MTRS



B/BZ 3PH channel
20 to 80mm passage 0.75kW - 11kW
Up to 3600 LPM & 30 MTRS



GDH 1PH & 3PH grinders
1.1kW - 1.5kW
up to 100 LPM & 30 MTRS



RW AD 1PH & 3PH ATEX
0.6kW - 1.1kW
up to 500 LPM & 11 MTRS

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