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Condition Monitoring

A new generation of technology
for a new generation of users

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Contacts



Publisher

Michael Dominguez



Advertising

Steve Pheasant

stevep@engineeringmaintenace.info

Email

Info@engineeringmaintenance.info

Website

www.engineeringmaintenance.info

Phone

Tel: +44(0)203 575 1170

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Condition Monitoring – a new generation of technology for a new generation of users

Easy to use new technology not only helps diagnose a wider range of faults, it also helps save the planet

Condition Monitoring (CM) has long been used to improve plant performance and reduce costs, by helping to diagnose faults and optimise maintenance schedules. There is a well understood kit-bag of CM tools and techniques, of which the leading method is vibration analysis, with thermography, ultrasound, oil analysis, motion amplification and others also widely used. None of these tools provides a universal solution to every situation, despite what some of the vendors would try to claim. Rather, like any kit of tools, the skilled practitioner understands the capabilities of each tool, and selects the most appropriate tool, or combination of tools, for the particular task in hand.

Nowadays, with the increasing emphasis on sustainability and reducing carbon footprint, there is a new generation of condition monitoring solutions that can also provide energy monitoring and energy optimisation capabilities, based on electrical measurements to give information on electrical, mechanical and operational problems all in one go.

Electrical CM concepts

A variety of electrical condition monitoring techniques have been widely used for years, including Partial Discharge (PD) to detect early deterioration of insulation, Motor Current Signature Analysis (MCSA) which has mainly been used to identify specific motor faults, Motor Start-Up Current Analysis and others. A new technique called Model-Based Voltage and Current analysis (MBVI) blends the benefits of some of these electrical techniques with vibration analysis, to give useful information on a range of mechanical problems, like bearing faults, belt drive problems, looseness and rubbing etc, electrical problems with the equipment like motor rotor or stator problems, issues with the electricity supply such as phase imbalance or high harmonic distortion, and perhaps most interestingly, energy efficiency assessment.

Because these systems work by measuring voltage and current being drawn by the motor, all connections are carried out in the switchgear, which is almost always in a clean, dry, non-

flammable area, so these systems avoid the need for expensive ATEX ratings and are ideal for monitoring the condition of inaccessible equipment. The systems automatically compensate for load and speed, and even make automated allowances for distorted waveforms that can be present with inverter driven equipment.

An example from Faraday Predictive

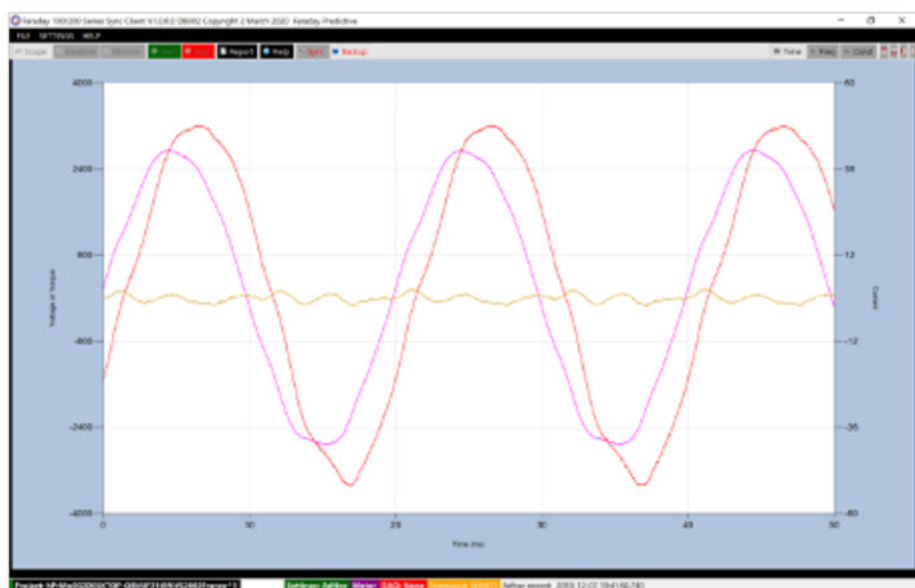
An example of this new technique and the kind of outputs they can provide comes from Faraday Predictive and is available in both portable and permanently installed forms. The impressive capability of this technology can be seen in some of the outputs that these systems provide, which include both current and predicted condition of the equipment at an overall level and the current and predicted status of individual faults up to three months into the future, allowing specific maintenance plans to be drawn up with the right materials for the right work at the right time.

These systems automatically provide information on each fault detected, describing the nature of the fault, how the system has detected it, the impact of this fault, and the recommended corrective action, in addition to the predicted future condition to allow timing of maintenance work to be optimised.

As well as providing detailed electrical measurements such as the voltage and current, the supply frequency, power factor / phase angle, active and reactive power, phase imbalance on both voltage and current, and Total Harmonic Distortion on both voltage and current, the system also assesses the energy impact of any faults present. The proportion of the total energy being consumed by each fault is displayed, allowing cost-justified decisions on corrective action.

Many of these electrical parameters also have implications for mechanical reliability – for example, a phase unbalance on a 3-phase current (meaning that not all phases are the same amplitude) creates a twice per cycle oscillation in torque created by the motor – which puts additional stress on things like shafts and couplings. And harmonic distortion, which

Below: Figure 1





Below: Figure 3

represents current flowing in and out of the motor but not doing any effective work in turning the shaft, creates additional heating in the motor which is not good for reliability. A widely used rule of thumb is that a 10°C rise in motor temperature halves the life of the motor windings.

How MBVI systems work – subtle changes in the relationship between voltage and current

Most engineers are familiar with the fact that an electric motor will draw more current when it is under a higher load, and a lower current when it is under lower load, even though the supply voltage is constant. What they may not be aware of is that this current variation occurs not just

with major load changes like a pump discharge valve being opened, it also applies to smaller, shorter duration effects that may occur as fast as several times per rotation of the motor shaft, for example caused by phenomena such as rolling element bearing problems. As the figure 1 shows, the current waveform can end up significantly distorted relative to the voltage waveform. Note that in this case the voltage waveform (pink) is itself significantly distorted away from a pure sinusoidal shape, even though this motor is driven direct from the mains supply. This is not unusual – the voltage waveform in many industrial situations can be distorted by a variety of non-linear loads connected to the network. The current waveform (red) is noticeably more distorted than the voltage

Below: Figure 3



waveform – which is caused by the behaviour of the motor and the driven equipment.

The small wiggly brown line across the middle of the diagram represents the distortions on the current waveform which have not been caused by distortions on the voltage waveform, and therefore must have been caused by phenomena in the machine. This residual current signal can be thought of as directly equivalent to a raw vibration signal – and can be analysed in the same way, analysing the magnitude and frequency of these distortions to identify the underlying causes and their severity.

Use in practice

Portable MBVI systems such as the Faraday Predictive P100 shown in figure 2 can be used to collect data from a wide range of equipment – like a portable vibration data collector. They can provide an easy means of becoming familiar with the technology, prior to committing to a permanent installation.

For users who want 24x7 monitoring of their equipment, systems such as the Faraday Predictive S200 (figure 3) are designed for permanent installation inside the motor starter cabinet.

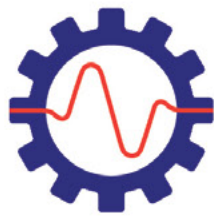
These systems are already providing benefits to users in a range of industrial applications, including Oil and Gas, Energy, Food and Drink, Utilities and others.

If you would like to join them in using this technology, or just want to find out more, contact Faraday Predictive on 0333 772 0748 or info@faradaypredictive.com

Geoff Walker, Operations Director of Faraday Predictive, is Chairman of the Electrical Condition Monitoring working group of the British Institute for Non-Destructive Testing

(BINDT). He also sits on the BSI and ISO working groups responsible for standards for Condition Monitoring and Diagnostics of Machine Systems. A Mechanical Engineer by background, he has decades of experience in automated fault diagnostics and the optimisation of maintenance strategy.





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Cloud-based expertise secures INEOS contract for AVT Reliability®

Plant reliability specialist AVT Reliability® has been awarded a three-year contract to provide proactive condition based maintenance (CBM) support to leading chemical company INEOS.

The contract, which was awarded following a formal tender process, will involve the monitoring and maintenance of more than 1,500 pieces of rotating equipment at INEOS' Grangemouth site in Falkirk, Scotland.

AVT Reliability® has been providing its expertise to the Grangemouth site for more than 13 years. It is one of INEOS' largest manufacturing sites and is home to Scotland's only crude oil refinery, producing the bulk of fuels used in Scotland.

A key factor in securing the new contract was the Cheshire based company's ability to evolve INEOS' traditional condition monitoring programme into a reliability focused, digital CBM

programme. It will integrate its bespoke cloud based asset management system, Machine Sentry®, into site operations as part of the contract.

Frederic Thomas, Managing Director of AVT Reliability®, said: "We're delighted at this opportunity to continue our reliability support for INEOS.

"Our track record of consistency and quality of service, as well as our ability to demonstrate we could deliver a risk free and seamless transition to the Machine Sentry® system, were key factors in securing this contract.



"The data driven approach to CBM offered by ADA™ the Automated Diagnostic Assistant within Machine Sentry®, will significantly enhance the reliability programme at Grangemouth and the INEOS team will also continue to benefit from the highest number of trained and skilled condition monitoring consultants in the UK."

For more information visit:
www.avtreliability.com

Proactive Maintenance (or How to prevent repeated bearing failure!)

Condition Based Maintenance (CBM), using tools such as vibration analysis, thermal imaging, ultrasonic and oil analysis, is now clearly recognised as being key to running an efficient maintenance program.



Staying with planned maintenance, or worse still breakdown maintenance, strategies is expensive and unreliable, and particularly in these harsh financial times can prove to be the death sentence for a production facility.

Whilst they are using CBM tools, service and maintenance personnel bring another valuable skill to the job – they use their eyes and ears! For example, a vibration analyser indicates that a bearing is likely to fail prematurely sometime in the next two months – but why has this happened? A simple inspection may show that the drive coupling is worn, which can then be replaced along with the bearing. This is Proactive Maintenance, identifying the root cause of the problem and correcting it. What if the worn coupling wasn't changed? – The bearing would simply have been replaced only to soon wear out again.

It is generally accepted that the three main causes of premature bearing failure in rotating equipment are due to:

- Out of balance
- Misalignment
- Lack of lubrication

Fortunately, thanks to modern technology, all of these conditions can be detected very easily using extremely affordable easy to use handheld vibration analysers.

Out of balance shows up as a **large** amplitude vibration at the **running speed** of the machine.

Misalignment on the other hand generally shows up as an additional large vibration at **twice the running speed**.

Lack of lubrication will result in high frequency vibration (bearing noise) that is not necessarily audible to the human ear but can easily be detected by a vibration analyser.

Finally, **machine looseness** will typically generate vibrations at higher harmonics of the machine running speed (e.g. **three times running speed and above**).

These days, once diagnosed, all these faults can easily be remedied in-house using affordable easy to use tools such as laser alignment systems, in-situ rotor balancers or even a simple grease gun!

Technology to the rescue!

Not so very long ago CBM tools used to be expensive and difficult to use. But thanks to modern technology, these tools are now not only extremely affordable; they are also very easy to use.

The TPI 9070 is a simple to use, incredibly low cost vibration analyser that records, analyses and



displays vibration signals at the push of a button. The unit includes colour coded alarm levels based on ISO vibration values and bearing condition. It also incorporates a fully zoomable vibration frequency spectrum (FFT) display with cursor, and diagnoses out of balance, misalignment, looseness and bearing faults.

TPI manufactures and supplies a complete range of low cost, high performance, easy to use vibration analysis tools for maintenance engineers. TPI's products are all incredibly easy to use, from the simple one-button-to-press, TPI 9070 to its top-of-the-range units for condition based maintenance, machine balancing and alignment.

The TPI 9080 (Intrinsically Safe **ATEX** version also available) is the latest in a line of easy to use high specification maintenance products and perfectly complements TPI's family of condition based monitoring and inspection systems, offering high level functionality and capability at extremely low cost. The TPI 9080 is capable of storing machine routes (as simple lists) that can be followed by even the lowest skilled operative to collect and store vibration readings for transfer to the included free VibTrend PC trending software. This allows faults to be identified well ahead of the point at which they start to become a problem that could result in excessive bearing wear for example.

For more information visit:
www.tpieurope.com

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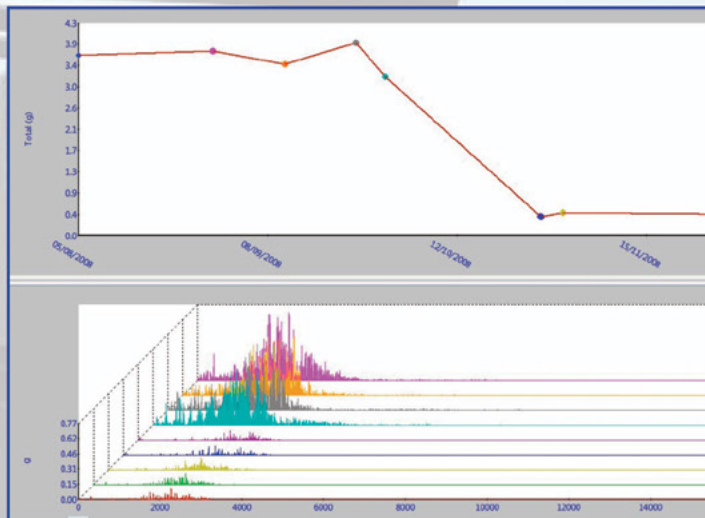


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Deadly degrees of difference

How small changes in temperature can impact productivity

Temperature plays a crucial role in everyday life. One small change could impact something simple such as a morning coffee or larger aspects such as seasons and personal health. In manufacturing, temperature can mean the difference between productivity and costly mistakes, particularly when working with thermal oil. Here, Clive Jones managing director of thermal fluid supplier Global Heat Transfer, explains how temperature can impact the performance and life span of a heat transfer fluid.

In June 2019, Müller UK recalled two Cadbury desserts from supermarkets after discovering the possible presence of *listeria monocytogenes*. To kill off listeriosis in food, manufacturers must ensure products are heated to at least 74 degrees Celsius. Just one- or two-degrees difference will compromise food products and could be dangerous to consumers, as Müller discovered.

Food manufacturing is not the only industry that demands precise temperature control. Any industry that requires indirect heating processes should ensure that their system operates at the optimal temperature. For example, an inaccurate temperature could prevent chemicals from blending in medications, stop a plastic from forming or could put the safety of workers on an offshore oil rig at risk. Once products or facilities are compromised, manufacturers may have to throw away entire batches of products or evacuate and drain the heat transfer system, incurring high costs.

Arrhenius' Law

Manufacturers can avoid operating at the wrong temperature by selecting the correct thermal fluid for an application. Heat transfer oils are designed to have a specific set of characteristics to ensure it is thermally stable and performs well at high temperatures.

Arrhenius' law suggests that increasing temperature by just ten degrees can halve the expected lifespan of a fluid, so manufacturers should always look at operating temperature when selecting thermal oil. Thermal fluid manufacturers will outline the entire operating temperature range of a fluid. Engineers should select a fluid that can safely and efficiently reach the temperature required for the application. Heating a thermal oil to higher temperatures than its specification will speed up degradation, as Arrhenius' law suggests, decreasing thermal stability and productivity.

Efficiency

All heat transfer fluids degrade over time, but the speed of degradation will increase if the temperature exceeds the recommended range.

At high temperatures, the bonds that exist between hydrocarbon chains start to break, resulting in a process known as fouling, caused by the production of carbon in the system. As the concentration of carbon increases, sludge starts to accumulate on the inside of heat transfer system pipework. This build up reduces the efficiency of the heat exchange.

As soon as this impacts the product, such as an inconsistently cooked food or chemical that does not blend, manufacturers need to cease production and drain, clean and flush the entire system.



Maintenance is key

Choosing the correct heat transfer fluid from the outset ensures that temperature will not impact production. However, once the fluid enters the system, the correct fluid will still be operating at the high temperatures that will eventually lead to degradation.

Engineers should implement a preventative maintenance schedule, such as Global Heat Transfer's Thermocare, to regularly sample heat transfer fluid and monitor the system. Engineers should sample fluid when the system is hot, circulating and closed to get an accurate representation of fluid condition inside the system. Results analysis can detect any issues, allowing engineers to plan maintenance so that it does not negatively impact production.

Whether a coffee is too hot or too cold should not make much of a difference to the rest of the day. However, as Müller UK learnt, temperature can make much more of an impact in manufacturing. Carefully choosing a fluid based on its properties and implementing regular monitoring and maintenance is the only way to ensure that temperature does not negatively impact a production line.

For more information visit:
www.globalhtf.com

As cunning as a fox: AUMA's new smart actuators

What do a fox and an electric valve actuator have in common? A lot, if the actuator in question is AUMA's brand-new PROFOX. Like its namesake, PROFOX is not only cunning and adaptable but also extremely hardy.



AUMA's more than 50 years of experience developing and manufacturing electric actuators has yielded a high-performance actuator series with exciting new features and an excellent cost-benefit ratio. Aimed at applications requiring fast and precise positioning, utmost flexibility and future-proof interfaces, the smart and compact PROFOX series is suitable for all industry sectors, including water treatment, combined heat and power plants, process industries, and shipbuilding.

Cunning.

Built-in intelligence makes PROFOX equally suited to both simple open-close duty and challenging modulating applications. Motor speed is

adjustable, ensuring fast and precise positioning without overrun. Soft start and soft stop functionality increases valve lifetime. Operating costs are low, thanks to high mechanical efficiency and low standby consumption. Innovative diagnostics ensure long-term availability and future-proof PROFOX actuators for IIoT applications.

Adaptable.

AUMA PROFOX actuators work with gate, butterfly, ball and globe valves. There are multi-turn versions for torques of 10 – 100 Nm and part-turn versions delivering 32 – 600 Nm. A linear actuator will follow soon. Modular design ensures flexible configuration, rapid delivery and consistent

operation. Host system integration is equally flexible; PROFOX actuators support the most common communication protocols and are well prepared for future evolutions. Compact design allows PROFOX actuators to fit tight spaces.

Hardy.

The PROFOX series is engineered and built in Germany – and designed to last, even under the toughest process conditions. High-quality metal housing with IP67 protection (IP68 optional) and AUMA's unique corrosion protection, which meets the highest C5-M/C5-I requirements of EN ISO 12944-6, ensure that PROFOX actuators have a long life at temperatures from –30 °C to +70 °C.

PROFOX actuators are simple and easy to use. Installation and commissioning are fast and convenient, using either the integral pushbuttons or an intuitive app. The FOX-EYE indicator light and a position indicator on the housing clearly show the actuator status at any time, even from a distance.

"The new PROFOX actuator series is set to lead the market thanks to its unique combination of features," says AUMA product manager Christoph Edelmann. "It offers unprecedented intelligence, precision, efficiency and flexibility at a very attractive price."

For more information visit:

www.profox.auma.com

AUMA Actuators Limited

Generation House, Yeo Bank 3
Kenn Road, Clevedon
North Somerset, BS21 6TH

Tel: 01275 871141

Email: mail@uma.co.uk

Visit: www.auma.co.uk

New wireless sensors enable automated machine monitoring for reliable rotation in heavy industries

SKF has released a compact and cost-effective vibration and temperature sensor for monitoring the condition of rotating parts on heavy industrial machinery.



Designed principally for use as part of an SKF Rotating Equipment Performance (REP) solution, the sensor - called the SKF Enlight Collect IMx-1 - enables customers to reduce both expensive unplanned downtime and their maintenance costs.

Product Line Manager at SKF, Chris James, says: "Industrial plants are under increasing pressure, and as a result, production hours are increasing. At the same time, our customers need to avoid unplanned downtime, while reducing their capital investments. Enabled by the new SKF Enlight Collect IMx-1 they can easily get started with a fee or performance-based contract, and access automated predictive maintenance and reliable rotation on their operating budget.

Powered by long-lasting batteries, this cost-effective sensor can be deployed in large numbers to automate the gathering of data regarding the health of machinery, a process typically carried out by technicians with manual portable devices.

When mounted to a bearing housing, collected data can be wirelessly sent to a host computer network, where it can then be forwarded to cloud-based analysis services at SKF REP centres. Chris continues: "As a result, the new, highly accurate, robust sensors enable data to be collected more frequently - over hours and days, instead of weeks and months - from locations that were previously inaccessible by hand, using fewer technicians."

The system relies on a "mesh network", which allows the sensors to relay data between one another. This means that data can be routed around radio obstacles, such as pipework and liquid storage vessels, that create signal blocks for conventional line-of-sight systems and sent over greater distances than would be possible using a single device. Chris explains: "The mesh network is self-forming, which makes it easier and quicker to deploy than other wireless communications technologies such as Wi-Fi or Bluetooth. It is also innovative in the way it manages available bandwidth and the power consumption of the

sensors, which leads to a long enough battery life to meet the needs of our multi-year service contracts."

The SKF Enlight Collect IMx-1 has been designed specifically to achieve a tough ingress protection rating of IP69K. This means it will work reliably when exposed to dust, dirt, oil, grease, contaminants, flying debris, temperature changes, wind, rain, high-pressure hot water washdowns and more.

"Critically, the sensor gathers data consistent with our manual data-collector, particularly when it comes to detecting early-stage bearing defects. Although severely damaged bearings are relatively straightforward to detect, by that stage they are close to failure - the key is to find defects early, so that corrective action can be planned in good time with minimal disruption". However, extracting the tiny signals of an early-stage defect from background noise is difficult. The SKF Enlight Collect IMx-1 exploits SKF's acceleration enveloping technology to achieve this.

Chris concludes: "Any condition monitoring programme is only as good as the measurements it takes. SKF has been executing predictive maintenance contracts on a large scale for decades, so we know how a wireless device needs to perform, and the result is the SKF Enlight Collect IMx-1. However, wireless devices in themselves do not deliver reliable rotation - that is achieved with the combination of analysis experience to provide machine insights and mechanical engineering competence to support execution of any corrective actions. And now delivered via new fee and performance-based business models, customers have a new way to achieve and pay for improved Rotating Equipment Performance."

For more information visit:
www.skf.com

Hart's heaviest door completes contract

The installation of a three-tonne insulated roller shutter manufactured by Hart Door Systems completed a work package which has seen a total of 40 doors installed over the last year for Taylors of Harrogate, the independent family tea and coffee company.

Kyle Pendergood at Hart Doors says: "The installation of the shutter concluded a project which we have been involved with through Sir Robert McAlpine and which has seen just about every Hart door product installed – from our Speedor high speed doors to fire shutters, security shutters and steel personnel doors. This has been one of our largest contracts."

"The final installation was a challenge. Apart from

its weight, the roller shutter was 10.5m wide and 6.3m high and was being installed in an area where the headroom was very tight. So much so a crane was used to lift the shutter into position after opening two holes in the building's roof so lifting chains could be dropped through to facilitate moving the shutter into position," adds Kyle.

Nick Hart, Hart's newly appointed managing director, adds: "This was a great effort by the



factory and the management and installation teams. It was delivered and installed safely, a credit to all involved."

For more information visit:

www.hartdoors.com

Or call: 0191 214 0404

Contechs Signs Up To 'National Effort' To Tackle Coronavirus Warwick-Based Firm Stands By To Produce Vital Medical Equipment For NHS

Contechs has signed up to join the 'national effort' to provide urgently needed protective equipment to hospitals in the fight against coronavirus.

The Warwick and Basildon - based design, engineering and recruitment firm is supporting the government's call for businesses to be part of the UK's response to COVID-19.

The award-winning firm is on standby to design and manufacture vital medical equipment and supplies for the NHS which is struggling to cope with the influx of seriously ill patients. The Warwick manufacturing headquarters will be using its state-of-the-art machinery to manufacture protective clothing including scrubs and gowns.



Contechs Managing Director Peter Jarvis said the UK's response to coronavirus is a top priority for firms around the country – with latest figures showing deaths have surpassed the 7,000 mark.

"The production of ventilators and protective clothing at hospitals is a national priority and it is imperative that every business with the capabilities helps in the battle against coronavirus," said Mr Jarvis.

"We have all seen the incredible work of our doctors and nurses in the NHS, but with such a high number of patients being admitted to hospital every day and a lack of vital equipment, there is a real need for businesses to work together and do all we can to help in these unprecedented times."

The business works with some of the world's largest automotive clients, including Ford and Jaguar Land Rover, employing more than 1,000 people at its sites in Warwick, Basildon, Germany and Slovakia.

Contechs, which is one of the UK's fastest growing businesses, has made significant investment in its sites over the last four years with further exciting plans in the pipeline.

Mr Jarvis added: "We are incredibly grateful that we have the capabilities to switch production and use our high-end machinery to assist the NHS in their tireless efforts. We would encourage other businesses to do the same and help save as many lives as we can."

For more information visit:

www.contechs.co.uk

Upgraded Hi-Line Adsorption Dryers Ideal For Breathing Air Applications

Atacama-CT Plus adsorption dryers from Hi-line Industries, a leading UK supplier to the compressed air sector, now feature upgraded diaphragm valves that are helping these point-of-use units prove even more reliable for Class '0' breathing air applications in the medical and hospital sectors.



Hi-line Industries will remain open throughout the COVID-19 pandemic to help serve the medical and healthcare industry, as well as those involved in food production. The company's service and main reception numbers, as well as the mobile numbers of key staff, remain available to support customers.

Based on a heavier duty specification, the new valves in the Atacama-CT Plus range now feature a tougher diaphragm that is resistant to both oil and aggressive condensate. This robust engineering is matched by other sturdy features on the valves, such as 100% rated anti-vibrating coils, special locating lugs and a machined pilot hole in place of an O-ring.

The Atacama-CT Plus series offers corrected flow rates from 0.2 to 2.83 m³/min. Importantly, this three-stage unit features a CT (Carbon Tower) located after the adsorption dryer. Clean, dry air passes through the third CT stage and adsorbs gases and aerosols depending on requirements and which zeolites are selected. To attain Class '0' for medical and food production applications the air needs to be oil-free, which can be achieved thanks to the use of high-quality carbon. Even working with a fully oil lubricated screw, vane or piston compressor, the Atacama-CT Plus will achieve better than ISO8573-1:2010 Class 1, giving a total oil concentration of less than 0.003 mg/m³, which is significantly less than that found in normal atmospheric air at home or in the workplace.



Also featuring the newly upgraded diaphragm valves is Hi-line's off-the-shelf model, the Atacama Plus. As standard, this unit dries air to a dewpoint of -40°C and comes with pre and after filtration. All Atacama Plus dryers, including the CT model, feature an energy-saving digital controller and dewpoint control function.

Atacama Plus is available for next-day delivery and offers capacity from 5 to 100cfm. The unit features aluminium top and bottom valve blocks and extruded aluminium chambers filled with desiccant. Air is dried as it passes through the desiccant bed in one of the chambers, while the other chamber regenerates using the PSA (Pressure Swing Adsorption) principle. The change is automatic and controlled by the digital controller. These popular and environmentally-friendly compressed air dryers are suited to sectors that include pharmaceutical, dairy, brewing and general manufacturing, to list but a few.

Further information is available from:

Hi-line Industries Ltd,
Green Street, Burton on Trent,
Staffordshire DE14 3RT
Telephone: 01283 533377
Visit: www.hilineindustries.com

WJA supports members carrying out Covid-19 essential services

The Water Jetting Association has issued an essential services notification form to assist its members in confirming that they have the right to travel during the Covid-19 emergency.



The form can be carried by personnel who work for Water Jetting Association (WJA) members to show police they are authorised to travel on behalf of designated essential services and businesses.

The WJA is the UK's member organisation for the water jetting industry. Its members include high pressure and ultra high pressure water jetting contractors, equipment manufacturers, equipment hirers and service users.

Under emergency government regulations, only people working for essential services and businesses can travel freely during the Covid-19 (coronavirus) pandemic while still observing required social distancing advice.

They include wastewater maintenance contractors, food retailers, storage and distribution facilities and vehicle repair companies.

Water jetting operatives involved in water utility sewer cleaning are also designed as key workers under the government's Covid-19 emergency regulations.

WJA Director David Kennedy said: "We have created this Covid-19 essential services notification form and validation system in response to concerns and needs of our members.

"They provide water jetting services for a range of essential services, most notably sewer cleaning services for the UK's water companies, so they

need to be able to travel freely, without hindrance, to carry out those duties.

"The form identifies the holder as supporting the delivery of essential services, as defined by the Government's rules in its response to the Covid-19 crisis. It also provides method for the details of the form holder to be confirmed by contacting the WJA.

"This is an example of an important benefit of being a member of the WJA. Our members can draw on the authority of the association to support their service delivery and reassure others of their bona fides during emergencies as well as during normal working conditions."

The WJA has taken legal advice to ensure its Covid-19 essential services form is drawn up correctly. The form gives the name of the WJA member and of the employee who is the form holder. Water jetting operatives must also show their WJA registration number.

For the forms to be valid, members must register the names of all operatives who will carry them with the WJA so it can confirm details if contacted as part of an essential service validation process.

David Kennedy said: "We are also reminding members that they must operate within government guidelines for the control of Covid-19 regarding site working.

"All work must be subject to a risk assessment in line with WJA Codes of Practice. There must be a clear focus on the impact of COVID-19 on the outcome of such a risk assessment."

For more information visit:
waterjetting.org.uk

Oyster Farm Reaps the Benefits of Denso™ Tape

Woodstown Bay Shellfish (WBS) Ltd, based in the South East of Ireland, run one of Ireland's largest oyster growing and exporting companies.

The family-owned business uses several tractors on an inter-tidal area of Woodstown Beach where the oysters are farmed in the 'A' class waters of the Waterford Estuary. The oysters are harvested by the tractors and trailers and transported back to the WBS factory in Dunmore East Harbour for processing.



In order to protect critical parts of the machinery from the corrosive marine environment, and to make sensitive electronics watertight, WBS Ltd have found that Denso™ Tape performs better than anything else they have tried over more than 20 years. Its versatile nature, along with being long-lasting and easy-to-apply in less than ideal application conditions, makes it an extremely reliable and cost-effective solution to WBS Ltd's problems.

Winn and Coales (Denso) Ltd are leaders in corrosion prevention and sealing technologies and have been supplying Denso Tape for 90 years. This application demonstrates how effective Denso Tape is when used in harsh environments and in unusual application situations.

For more information visit: denso.net

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NEW ProtecWork Protective Clothing From Snickers Workwear

Fully accredited, advanced Protective Wear for heat and flame, electrostatic, mechanical and chemical risk environments from the UK's leading workwear innovator.

Snickers Workwear's ProtecWork range has new additions to its protective wear garments including Class 1 and 2 hi-vis work trousers, tops and sweat shirts.

Fully accredited for a variety of risk environments such as heat and flame, electrostatic, chemical and bad weather conditions, all the garments are manufactured from tailor-made fabrics designed

to respond to the demands and risk factors of the conditions in which they're worn.

So with over 60 different garments and accessories to choose from, you can make sure you get the right protection, visibility, flexibility, comfort and freedom of movement on site. Check out the new Snickers ProtecWork range to fit your workday and wellbeing on site.



For more information on ProtecWork, visit www.snickersworkwear.co.uk
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Need High-Quality Compressed Air Fast?

Hi-Line's Dryer Rental Scheme Provides The Answer

Hi-line Industries, a leading UK supplier to the compressed air sector, has a solution for all companies seeking a temporary way of delivering high-quality, dry compressed air. An affordable and responsive rental scheme is now in place at the company, covering Hi-line's comprehensive range of class leading compressed air dryers.



Although hiring a compressor is easy enough for short-batch emergency runs or exceptionally busy periods, finding specialist drying equipment is not so straightforward. And yet air quality is just as important in temporary periods as it is during long-term regular operations.

Hi-line overcomes this issue by offering hire options on a vast range of compressed air dryers, including refrigerant, heatless, heat-regenerative and point-of-use models. High-quality, competitive filtration packs can also be provided.

The company's market-leading Tundra refrigerant air dryers, for example, are renowned for their robust and reliable performance. Moreover, the newly improved single-cell heat exchanger gives the most efficient transfer of heat at the lowest energy cost.

For those seeking heatless dryers, Hi-line can offer its proven HPSA (Heatless Pressure Swing Adsorption) units, which come in 'plug and play' format mounted on skids with their own filtration package as standard. Class-leading performance is assured with HPSA range, as it is with Hi-line's



series of heat-regenerative adsorption dryers, as well as its point-of-use desiccant adsorbers. The latter are ideal for the small-scale separation of humidity from compressed air systems.

From as little as £50 per week, Hi-line can supply from a huge stock of ready-to-go compressed air dryers, including Class O, Class 4 (+3°C PDP) and standard -40°C PDP desiccant units. Offering capacity from 5 to 5000 cfm, both short and long-term hire requirements can be fulfilled.

Importantly, control packages are available to suit every application, including heatless, heat regenerative, pneumatic, 24V, 240V, dewpoint and AEMS (automatic energy management systems).

Regardless of what type of dryer is required, delivery to site includes set-up by a fully qualified Hi line compressed air engineer, providing both convenience and peace of mind. If desired, a smart controller can be added to all makes of dryer as an energy-saving option, while N2 and O2 generators are also available.

Further information is available from:
Hi-line Industries Ltd,
Telephone: 01283 533377
www.hilineindustries.com

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With all the Hallmarks you find in Snickers Workwear – quality, comfort, durability and street-smart style, Solid Gear safety shoes and boots are fast becoming one of the most popular brands chosen by discerning tradesmen and women.

With a wide range to choose from that integrate the type of modern technical designs you'll find in outdoor and athletic footwear, Solid Gear safety footwear combines best in class materials for comfort, protection and durability.

There's a host of first-to-market features like GORE-Tex Surround Technology for unrivalled and all-round breathability. Plus ETPU sports footwear performance that delivers unrivalled footbed

energy return that really puts a spring in your step.

Added to the Vibram outsoles and Cordura Rip-Stop fabric in other styles, you'll get rugged protection all day long. What's more, the GORE-Tex Fabric Technology also makes the footwear water repellent and waterproof to keep your feet dry. Added to which, the unique BOA Closure System on certain styles, distributes the pressure evenly across your feet to ensure a glove-like fit.

Overall, this combination of market-leading materials, fabrics, linings and high-tech features provides the kind of insulation and protection that will keep your feet warm and comfortable all day long.



To get more information on Solid Gear and Toe Guard - the Next Generation of Safety Footwear, visit the website at www.solidgearfootwear.com alternatively, call the Snickers Helpline on 01484 854788.

Steelcoat™ System Replaces Failing Pipebridge Protection

Winn & Coales (Denso) Ltd's Steelcoat 100/400™ system was recently employed to protect a pipebridge in Stoke-on-Trent where the previous bitumen-based coating was beginning to show signs of failure.

Due to the fees involved in erecting scaffolding and covers to protect the pipebridge during its repair, a cost-effective, easy-to-apply solution was required. CPC Civils selected the Steelcoat 100/400 system for the protection of 40 metres of 680 mm diameter pipe and 16 flanged joints, with Frazer Civils of Wednesbury supplying the material for the project.

The entire area to be protected was wire brushed

to remove loose pieces of the old coating before the new Steelcoat system was applied. Winn & Coales provided on-site training and returned to site twice to check on the projects progress, with three operatives completing the entire application in just one week.

Winn & Coales (Denso) Ltd are leading suppliers of corrosion prevention and sealing systems. Their Steelcoat 100/400 system provides an effective,



The Steelcoat™ system being applied (inset) and the protected pipebridge.

long-term solution for corrosion prevention on exposed steelwork and pipework, particularly in areas faced with damp working conditions.

For more information visit: denso.net

Raise Consistent Gas Pressure For CHP, Boilers & Burners

Secomak's range of gas boosters supply boosted pressure in a safe and reliable way, no matter if you are working with natural gas, town gas or biogas.

Our sealed bearing assemblies repel dust and dirt and make servicing easy, whilst ribbed fan chambers offer additional strength. Where other options are impractical or unrealistic, a Secomak gas booster is the simple solution.

Setting the standards, Secomak worked alongside British Gas to design and manufacture the first gas booster back in 1969, also sitting on the board of directors to define the British Standards (BS8487:2007 & 2013) as they are today. This created a common base for all gas boosters, in addition to other Secomak specific improvements including safety and performance.

Where are Secomak Gas Boosters installed?

- Offices
- Hotels
- Hospitals
- Restaurants
- Schools
- Factories

Compliant to British Standard 8487 (2007 & 2013)



Comprising a purpose-built centrifugal fan powered by an electric motor, each gas booster works to provide a pressure lift to the gas supply where the desired operational pressure cannot be achieved by the installation or gas supply alone. This allows sufficient gas pressure to operate burners, boilers and CHP's to operate efficiently and effectively.

The centrifugal design gives high performance from their small physical size, occupying less space whilst providing a lower power consumption than equivalent direct drive boosters.

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- Eliminate Downtime
- Ideal When Supply Is Critical



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HVTS Stops Alloy 625 Weld Overlay Corrosion in WtE Boiler

A waste to energy boiler was experiencing fireside corrosion. Shop applied Alloy 625 weld overlay was showing signs of premature accelerated degradation. IGS was contracted to apply an HVTS cladding on top of the weld overlay in situ to stop corrosion and ensure the reliable and safe operation of the boiler.



After 10 months in service, the IGS thermal spray solution had no defects. As a result, additional areas of degrading Alloy 625 were protected with HVTS.

Renergia Perlen

The Renergia waste incineration plant is a joint effort of all waste disposal associations from Central Switzerland and Perlen Papier AG. Renergia Zentralschweiz AG is responsible for more than just recycling waste from Central Switzerland.

It supplies Perlen Papier AG with process steam, the district heating networks Rontal and Emmen with hot water and provides electricity for approximately 44,000 households. Following two years of construction, the Renergia Waste to Energy plant went into operation in 2015.

WtE Boiler Fireside Corrosion

The Hitachi Zosen Inova (HZI) furnace installed at Renergia is an inclined moving grate four-pass waste to energy boiler with an external economizer. The boiler's thermal capacity is 47MW with the steam flow of 58 t/h and steam pressure of 41 Bar at 410°C.

Alloy 625 weld overlay was shop-applied on the fireside water wall panels to protect the WtE boiler tubes from fireside corrosion. After months of operation, an inspection revealed accelerated degradation of the Alloy 625 just above the grate.

Several solutions were considered to manage the boiler tube metal wastage and improve reliability and lifetime of the water walls, including replacement, field applied weld overlay and thermal spray.

Evaluation of Alternatives

The replacement of affected water wall sections with new tubes would have been time consuming and expensive, considering the estimated frequency of replacement of 5 years or less.

Like-for-like weld overlay repair is an intensive and time-consuming solution. It requires preliminary grinding of the degraded surface layer prior to the application of new weld overlay. Moreover, both aforementioned solutions wouldn't exactly solve the problem, as the same corrosive media attacking existing weld overlay would still be present.

The third option was thermal spray. "Thermal spray" technology had mixed results in boiler applications and the plant invited 4 thermal spray vendors to perform test applications on different sections within the boiler. Each vendor was given a side wall inside the 2 lines. Out of the 4 claddings applied, only 2 delivered satisfactory results. IGS HVTS solution was found to be the best, both in terms of performance and capacity. Multiple IGS HVTS guns can be operated inside the boiler at the same time with no capacity limitations.

Supported by comprehensive laboratory testing and extensive field experience IGS HVTS Alloy Cladding has no issues with permeability or disbondment and can offer lasting protection, where other technologies fall short. The test application results and additional references convinced the head of maintenance to choose IGS HVTS as the solution to their problem.

HVTS Application

IGS HVTS application took place in 2017 on a 20m² area located on the left membrane wall at the very low furnace of the moving grate WtE boiler above the refractory. The plant also had a thermal spray (TS) coating applied by a different vendor on the right-hand side of the membrane.

These areas were then inspected in 2018 to determine whether HVTS and other vendor's TS were successful at stopping the weld overlay (WMO) degradation. The inspection of the HVTS/WMO interface showed that the area clad with IGS HVTS was no longer affected by corrosion.

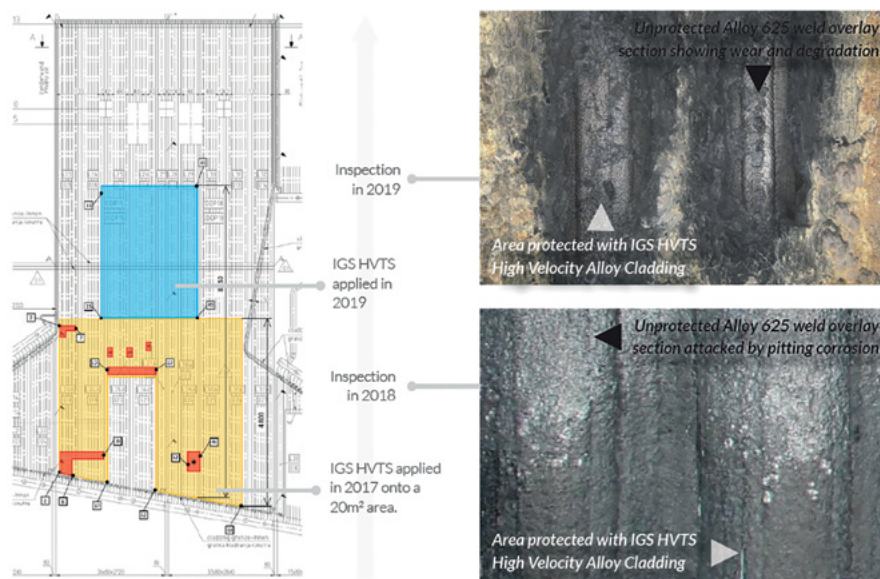
Unprotected Alloy 625 WMO and other vendor's TS, on the other hand, both continued to degrade.

It was decided to extend the scope and apply HVTS alloy cladding onto an additional ~20m² area in 2019. Inspection later that year, in August 2019, confirmed the following. The areas protected with high-velocity thermal spray (HVTS) alloy cladding were not exhibiting any pitting corrosion or wastage. Adjacent unprotected Alloy 625 weld overlay sections were showing signs of wear and degradation.

Weld Overlay Protection: Inspection and Results

Markus Benz, head of maintenance at Renergia Zentralschweiz AG, commented: "IGS Europe s.r.o. has been selected in November 2017 to apply ~20m² of their IGS material using their HVTS technology. They mobilized efficiently and performed within the tight requested schedule the expected scope of work.

After 10 months in operation, a short inspection of the waste to energy boiler was performed in September 2018 confirming the good performance of the coating. As a result, another area was ordered for application in January 2019. Early January a deeper inspection confirmed the



good overall behavior of the cladding after 14 months in operation.

The protected area has been doubled so that we expect to operate safely until our next turnaround in 18 months. IGS has successfully applied the contracted scope within the critical path in a highly professional manner, with reliable and transparent communication."

Ruedi Kummer, Director of Renergia Zentralschweiz AG, commented: "Thank you for the inspection review. It seems that the idea, to cover Alloy 625 with HVTS overlay, could have enormous potential."

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integratedglobal.com

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Riello's premix burners up to 3MW

Riello RX premix packaged burners are available in outputs up to 3MW, offering NOx levels of less than 40mg/kWh, with high turndown ratios of up to 8:1.

The main differences between traditional pressure jet burners and premix burners relate to the ways in which the air and gas is mixed and in the technology of the combustion head.

In traditional pressure jet burners, the gas and the combustion air are mixed at the point of ignition on the end of the combustion head in the space available in the combustion chamber (diffusive flame).

Riello RX burners feature an exclusive design that includes a patented woven wire gauze 'sock' covering the combustion head cylinder. This arrangement enables a very compact flame with a diameter directly related to the burner firing rate, ensuring precise heat control and optimum efficiency at all loads.

The high turndown makes RX burners ideal for systems with variable heat loads where low NOx levels are also required. These range from condensing boilers through to process applications such as spray booths and industrial ovens.

The geometry of the gas ports is designed specifically to ensure that throughout the modulation range the speed of the air/gas mixture is sufficient to avoid burn-back. Also, the high combustion intensity developed on the premix burner head means that a greater heat output is achieved over a much smaller combustion head dimension, when compared to other burner technologies.



RX burners can be used in conjunction with variable speed drive motors to reduce electricity consumption and lower noise levels even further than the typical 30% noise reduction compared to many other combustion applications. Control options include progressive two-stage operation and fully modulating via 0-10V or 4-20 mA. Full electronic control with operational and diagnostic display is also available.

For further information visit:
www.rielloburners.co.uk

What's The Real Cost Of Pressure Vessel Repair?

In this short blog Leigh Bryan, national consultant specialist at heat transfer specialist Fulton, looks at the costs associated with shell and tube steam boiler pressure vessel repair (and asks whether you really should be questioning its cost or the value of your peace of mind).

Whether you're looking at a multiple tube repair or furnace section replacement (the infamous D Patch Repair), the costs associated with pressure vessel repair can quickly and easily begin to spiral.

The actual cost of a repair can run into tens of thousands, with certified materials, coded welders, insurer-appointed NDT inspectors and, in the case of D patch repairs to conventional 3-pass boilers, refractory replacement.

The time taken to carry out repairs may also mean a hire boiler is needed to maintain delivery of steam to the site and/or process. Another cost that can run into thousands of pounds.

Let's also not forget about the potential financial, environmental and health & safety impacts of an



acid clean. Here, specialist teams using often-expensive solvent- or alkaline-based treatments are required, which means the solutions used must then be stored or neutralised and disposed of in a safe manner that can also be potentially expensive.

Additionally, there's the financial impact from the boiler/process downtime, which can lead to the loss of services or product. In fact, in many cases the cost of repair is insignificant compared to the cost of several days without steam while a repair is carried out or a replacement hire boiler is delivered, installed and commissioned.



So, if you're specifying steam raising plant for a new project or even replacing ageing steam boilers, don't just consider the initial capital costs but look at the bigger picture, such as the design of a steam boiler and the potential risks from boiler/process downtime.

Unlike conventional vertical and horizontal shell and tube steam boilers – containing long steel tubes through which hot gasses from a furnace pass and around which the water to be converted to steam circulates – the design of Fulton's radical VSRT utilises a floating, self-compensating heat exchanger design that eliminates the risk of thermal shock. Factor in no tubes (so a minimum 9.6mm material thickness) and NO refractory and the probability of a costly repair is greatly reduced. The VSRT is also backed by an industry-defining, 10-year pressure vessel warranty.

So, perhaps the question you should really ask isn't what the cost of steam pressure vessel repair is, but what is the value of your peace of mind?

For additional information about Fulton, please visit www.fulton.co.uk.

LANEMARK Gas Process Burners

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FD-C high turndown oven/dryer air heating burners.



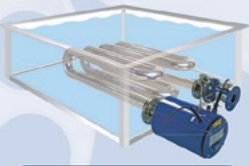
FD-E low cost high turndown oven/dryer air heating burners.



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Midco HMA high efficiency, high turndown, air replacement or "make-up" air heating burners.



TX high efficiency small diameter immersion tube tank heating systems.

Lanemark gas burner systems offer users reliable, high efficiency, process heating solutions.

FD Series Packaged Oven/Dryer Burners

- Specifically designed for process air heating applications in convection ovens and dryers
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TX Series Gas Fired Process Tank Heating Systems

- High efficiency (80%+) heating of all types of spray and dip process tanks
- Compact high efficiency small diameter immersion tube heat exchangers occupying minimum tank space
- Accurate performance modelling using Lanemark TxCalc design software
- Heat Input Range: 15 kW (1½") – 1150 kW (8")

Midco HMA Series Air Replacement or "Make-Up" Air Heating Burners

- Direct fired, high efficiency burner systems, for high volume air heating applications such as paint spray booths, ovens and dryers.
- Supplied either as Midco burner heads for OEM system integration or as Lanemark DB or FDB complete packaged systems including modulating gas valve trains and controls
- Wide range of firing rates to suit alternative temperature rise and air velocity system requirements
- DbCalc system design software

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New Lanemark Burner Design Opens Up New Opportunities

The selection of the most effective temperature and associated process burner control system are key factors impacting on the overall efficiency of gas-fired industrial recirculating ovens or dryers, particularly in terms of energy usage.

That's the view of Lanemark Combustion Engineering Ltd. – designers, manufacturers and installers of process gas burner systems worldwide.

Now, the latest addition to the Lanemark FD range – the FDB packaged or semi-packaged burner – brings additional advantages in terms of both location and, importantly, flame profile. These offer clear benefits for system engineering and can also provide opportunities to simplify both ad-hoc and planned maintenance procedures.

"FDB burners offer flexible, high turndown control of both gas and air," says Lanemark's Sales Director, Jeff Foster. "Flame length is both short and consistent irrespective of the FDB rating specified, optimising its suitability for mounting inside an enclosure." He adds that the system is also designed to reduce emissions to minimal levels.

As with all Lanemark TX (tank heating) and FD (forced draught heating) burner systems, the FDB is available in a choice of sizes and configurations to match application needs. Heat input options range from 9 to 1400 kW with the further choice of specifying either natural or propane gas.

In all cases, installations can include a compact, pre-piped modulating gas valve train and control panel which includes a burner controller, ignition transformer, differential air pressure switch and two three-way air valves as standard.

"The operational and environmental benefits of our FD range have been demonstrated in a long and growing list of installations in many different industrial sectors in both our UK and international market places," adds Jeff Foster. "The addition of the FDB unit not only extends application and performance options but



also acts as a further demonstration of our ongoing commitment to research, innovation and product development."

Importantly, in common with all Lanemark equipment, the company offers its comprehensive BurnerCare support package with the FDB. Often in the context of planned service agreements, the service comprises a blend of elements – from installation and commissioning to the provision of spares and ongoing engineer support – to ensure Lanemark BurnerCare makes a further, significant contribution to long-term installation performance.

For more information visit:
www.lanemark.com

Babcock Wanson Steam Boiler Fits The Bill For Award-Winning British Distiller

Silent Pool Distillers, producer of handcrafted, artisan, award-winning spirits, has installed a Babcock Wanson VAP 400 Coil Type Steam Boiler into its unique distillery on the Duke of Northumberland's Albury Estate located in the Surrey Hills.



The Boiler, which is being used to heat the distillation column, had to meet a set of distinct criteria which narrowed the field considerably, as Tom Hutchings, Head Of Distillery Operations for Silent Pool Distillers, explains: "We looked at various options and, as well as coming recommended, for our requirement Babcock Wanson offered the best package. We had a slightly unique challenge in that we were replacing an old boiler located in a container, so space was a limiting factor. The pipework from the container was also already in place so linking into the system whilst limiting the requirement to alter too much of it was very important."

The Babcock Wanson VAP 400 Coil Type Steam Boiler, which is highly compact in design and doesn't require a large pressure vessel, making it easy to install local to the steam user, met all the criteria for Silent Pool Distillers. "The install was definitely on the tight side but it worked out very well, aided by the thorough support of the team at Babcock Wanson" comments Tom.

The VAP 400 features three full gas passes, plus an in-built combustion air pre-heater to give high operating efficiency. With availability of steam from cold start in as little as three minutes and a low volume of water under pressure, it combines efficiency with safety, even at very high working pressure. With Silent Pool Distillers producing its spirits in batches, rather than a continuous operating process, the short time to produce steam has proven highly advantageous, as has the ease of use: "The unit itself is very simple to operate making its use throughout the day incredibly easy" states Tom.

For Silent Pool Distillers, it's not just the boiler that has proven invaluable, but also the service provided by Babcock Wanson. "The service has been excellent" comments Tom "and the Babcock team have always been very fast to respond. Whether it be the service department or the call out engineers, they have always been very generous with their time and made the effort to explain everything thoroughly which has really

helped us from an operational point of view as it's given us a much greater understanding of each of the components and what to look for if we have faults in the future."

Silent Pool Distillers is also benefitting from Babcock Wanson's Water Treatment Service which uses highly qualified, professional chemists to ensure the treatment and testing regime is completed to obtain an accurate picture of a site's specific requirements under a variety of conditions; this ensures the most appropriate chemical dosing regimen is always employed. In between scheduled consultancy visits, Babcock Wanson's unique vSteam web portal allows Silent Pool Distillers to simply enter daily readings online and receive real-time feedback support. The Water Treatment Service is backed-up with a five year corrosion warranty on the boiler coil. "You get a very thorough service" states Tom "and we really appreciate the value in the service".

The VAP 400 was supplied by Babcock Wanson complete with burner, feed water pump and control panel, assembled within a modified shipping general purpose container.

Babcock Wanson offers a complete range of products and services for boiler houses and other process heating needs, from steam boilers, thermal fluid heaters, rapid steam generators, process air heaters and hot water boilers to VOC and odour treatment by thermal oxidation, water treatment or process air heating solutions. The company aims to help optimise customer's energy production with high quality products and efficient service.

For more information, please contact Babcock Wanson on 0208 953 7111 or info@babcock-wanson.co.uk or go to www.babcock-wanson.co.uk

Rotamec Wards Off Maintenance Issues For Devon Hospital

While it can be argued that all maintenance is critical, nobody can argue that there is an application area more critical than a hospital. This is a zero-downtime environment - where availability of equipment, services and a tranquil atmosphere are symbiotically tied to patient recovery.



Maintenance contractors to hospitals must offer the fastest reaction and the optimum solution. For a hospital in Devon, the expertise of Rotamec, an electro-mechanical engineering service provider, has helped to guarantee patient comfort.

Hospitals are a hive of activity. This Devon hospital sees nearly 80,000 people at its A&E department every year, with roughly 7000 staff serving a local population of hundreds of thousands. At the forefront of the area's healthcare capability, the hospital offers patients access to vital services ranging from general surgery to mental health facilities. To guarantee an exceptional standard of care, the hospital ensures that all of its building services operate with maximum reliability, which is where Rotamec comes in.

Jonathan Whitlock, Branch Manager at Rotamec's Exeter facility, explains: "Our services focuses on the refurbishment or replacement of engineered equipment such as pumps, motors and gearboxes. At this hospital, we primarily help to ensure the reliability of the ventilation and heating systems. These are of course vitally important for patient comfort and the critical medical procedures that take place. Therefore, we must be able to respond to potential issues within hours, offering reliable engineering solutions within highly pressurised time periods."

Heating and ventilation ensures that all areas of the hospital are kept at a consistent ambient temperature. For areas such as operating theatres, the quality of air and heating available

is key to a successful procedure and patient recovery. Even something as simple as a faulty bearing on a fan motor can produce noise that is amplified through ductwork across the building, disturbing the tranquillity needed for fast patient recovery. Reliability of equipment translates directly to standard of care.

"Our on-site teams have been involved in a wide variety of works," Jonathan continues. "From repairing motors, changing bearings, servicing fans, refurbishing compressors, refreshing pumps to supplying new belts and spares – we can offer a complete turnkey service to keep these systems running as efficiently as possible. We have past experience working with engineering departments at hospitals in the local area, so our teams are able to work at these sites carefully and quickly."

"The needs of a facility such as a hospital must always come first. In the past, we've hired out generators and compressors for sites to guarantee available redundancy. Recently we delivered and installed an entirely new Atlas Copco compressor on short notice. Whatever the issue, we must be highly reactive from first call out to final installation and testing."

Jonathan concludes: "Another advantage we hold is that we can repair or specify new as is required. This means a cost-effective repair is always an option, which is beneficial in maximising the effectiveness of a maintenance budget. However, if a new unit is required, we can meet that need too. It's this flexibility matched with our reaction times that means we can effectively service the multitude of maintenance demands presented by large healthcare facilities,"

For more information visit:
www.rotamec.com

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Aggreko pledges prioritisation of critical sectors

As a global temporary power and temperature control specialist, Aggreko's role is critical to many sectors when an emergency occurs. It is for this reason that Aggreko remains fully operational across the UK and Northern Europe.

Chris Rason, Managing Director at Aggreko Northern Europe, has announced the company's pledge to prioritise all equipment for healthcare, utilities, food & beverage and pharmaceuticals companies in the UK. He says:

"From treating people in healthcare facilities and developing potential vaccines through to ensuring the provision of essential utilities and food supplies, many of our customers play a vital role in helping the current situation across the globe.

"Over recent weeks we have been preparing our business and taking immediate measures to ensure we are able to prioritise equipment for the following sectors: healthcare, utilities, food & beverage and pharmaceuticals.

"As with many people and organisations, we are now receiving enquiries that are new to both ourselves and our customers due to such unprecedented times. However, being classified as a critical support business means we are able to immediately mobilise our expertise and equipment for any given emergency.

"Our Quality, Health, Safety, Service and Environment team has rigorously reviewed all our processes to ensure our business can safely and effectively facilitate any jobs relating to the current COVID-19 situation. All our staff are fully equipped and trained, both physically and emotionally, to attend sensitive environments and install equipment where required. These measures are in place to make sure we are minimising all our risks



in the design and running of the projects, and that we do not contribute to the spread of the virus.

"I will do everything in my power to ensure our fleet of equipment and team of expert personnel is readily available when any customer needs us."

For more information, visit:
www.aggreko.com/en-gb/sectors-and-services/we-are-ready

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 **EcoCooling**
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A greener, more cost-effective way to cool

Evaporative cooling is an effective alternative to air conditioning that will keep your people, processes and products cool even on the hottest days of the year. Using simple technology, EcoCooling's evaporative coolers are the ideal low-cost, low-maintenance solution that enables you to maintain internal temperatures below 25°C all year round.

Effective and low cost

Typically, an EcoCooling unit will save you 90% of the operating cost and up to 50% of the capital spend, compared to refrigeration-based air conditioning. The solution is so efficient because it allows you to combine 'free' cooling with evaporative cooling. So, on the days where additional cooling isn't required, you can take advantage of the system's ventilation-only mode and benefit from maximum cost savings. On the days when evaporative cooling is enabled a standard unit will cost you less than 14p per hour to run, which is considerably less than the air conditioning alternative.

The green credentials of evaporative coolers are as impressive as the cost savings. With EcoCooling's units, you can cool an area the size of a tennis court using half the energy of a domestic kettle. This means you don't have to choose between having effective cooling and being environmentally-friendly.

Why is it so suited to industrial applications?

Evaporative cooling is more effective than air conditioning for most industrial applications, as it is designed for cooling large spaces. The fresh air technology means that open doors and windows have no adverse effect on performance and running costs. The versatility of this method enables you to blanket cool whole depots or spot cooling hot areas of a production line. All this makes evaporative cooling the ideal solution for

keeping down temperatures industrial settings, which is something with which traditional air conditioning struggles.

Available in several different configurations, EcoCoolers are suitable for installation in any building. What's more, the system can be fitted retrospectively or as part of a new build project, so it's completely flexible. With over 3000 installations worldwide, EcoCooling is a trusted and experienced UK manufacturer.

The solution in action

When a leading manufacturer, Herman Miller was looking for a ventilation and cooling solution at its PortalMill production site, EcoCooling had the answer.

The company needed a system that was suitable for the open nature of the facility and would keep areas prone to overheating cool whilst being cost effective and environmentally friendly. In its search for an effective solution, Herman Miller found UK manufacturer, EcoCooling.

Nine EcoCooling units were installed at the site, giving Herman Miller complete zonal control of the air temperature and humidity levels in the assembly and manufacturing areas at all times. This was ideal for the factory setting which had hot spots that required more cooling than other areas.

With the need for an all-year-round solution, the EcoCooling units were installed as part of a wider air handling system that allowed for evaporative and fresh-air cooling during summer and the recirculation of fresh air in the winter months.



The cooling solution has improved the working environment for Herman Miller's employees via zonal temperature control. It has also delivered energy savings for the company as the evaporative cooling solution is a completely natural, and therefore low-cost way, of producing refreshing cool air.

With the running cost being just 10% of traditional air conditioning, the operational cost is around just £3.15 per hour for the site, which has provided Herman Miller with notable yearly savings.

For more information and case studies visit our website:
www.ecocooling.co.uk

If you have a project in mind, get in touch to discuss your requirements:
sales@ecocooling.co.uk
01284 810586

Boost Cooling Tower Performance And Save Costs

Mark donoghue, director at dhd cooling illustrates how cooling towers can be fine-tuned for improved performance and cost savings



Cooling tower OEMs often assemble their systems from a collection of components manufactured by multiple suppliers selected to meet both technical and commercial challenges to create a bespoke range of cooling towers.

There are a number of key components that are essential for effective heat exchange to occur, and it's often the case that changes and improvements can be made to optimise your cooling tower performance.

As with most systems it is usually possible to take the Cosworth, Cooper or AMG approach and fine-tune your system to achieve better results.

Tuning basically means creating the best possible conditions from the right pieces of equipment to achieve the greatest performance, and in cooling towers it is no different.

This is not just to say that each individual component of your cooling plant can be tweaked to achieve better results, it also considers how these individual components work as a collection of systems.

In a car the important parts of your engine performance rely on getting the fuel to the right places at the right time, sufficiently aerating that fuel and effectively handling the exit gases from the engine.

This is no different in a cooling tower, where the water entering the system needs to be evenly distributed

across an effective heat exchange surface, which needs to come into contact with a sufficient volume of air that is also evenly distributed, for optimal heat exchange to occur.

In our travels around the UK looking at cooling systems some of the easiest successes when tuning a cooling system come from getting the water balanced across multiple units as well as evenly distributed throughout the equipment. Maldistribution of water flow will generally spread the system load unevenly across the available cooling surface. This will mean that the units with the highest water flow will need to reject the largest heat load, which will drive cold water temperatures higher which can be detrimental to your process; the units with the lower water loading may be able to deliver water at a lower temperature, but may also suffer from maldistribution leading to areas of low or no water flow.

Where cooling towers suffer from low or no flow throughout the cooling surface, air flow will be concentrated as these areas offer the lowest resistance to airflow, this results in the wetted areas of the towers being starved of air and thermal performance rapidly decreasing. This also leads to higher potential drift rates as the higher air velocity through the partially wetted channels can drag water out of the tower.

While some towers can handle larger variations in flow, many do not. Your system in many cases will



review the outlet temperature and drive the airflow to achieve set point, and if the airflow is not effective, then your fans will run faster (if using VFDs) absorbing more power to try and achieve the cold water set point, with much of this energy wasted due to air/water bypass.

Couple this with a changing demand on your system, where maybe your cooling requirement has reduced, then you have an oversized unit running flat out to try and reject the heat with only a portion of the airflow being effective.

While the interaction of air and water flow is the key to evaporative heat exchange, having the right distribution system, the correct heat exchange media, and all the other systems operating effectively have an effect on cooling tower performance.

This scenario coupled with changing demand and condition, means the right equipment then may not be the right equipment now.

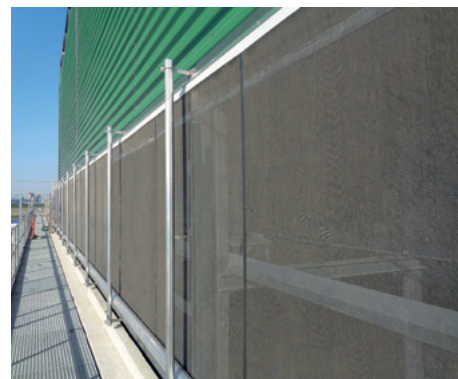
Taking this approach to each and every key component of your cooling tower can yield some great benefits.

Modifying fill choices, optimising fans, improving distribution, preventing air bypass, and improving air flow in general can get your cooling towers singing the right tune, and cost you less to run whilst delivering colder water to your process.

Here at DHD Cooling we offer an initial review on your system to see if there are things that can be done to improve performance and reduce operating cost. For more information call 01905 317370, email info@dhdcooling.co.uk or visit the company's website at www.dhdcooling.co.uk

Wind And Weather Protection Systems For Power And Industrial Sectors

DHD Cooling, working with Galebreaker, is constantly expanding its range of wind and weather protection systems to meet the many challenges in the power and industrial sectors.



incredibly easy to maintain and install, designed to isolate plume coils during the summer months when pluming is less likely to occur, maximising thermal performance at a time when it is needed the most.

External protection systems include weather shielding of large open structures, from high winds or extreme cold due to high winds. Using these systems is considerably cheaper than cladding, requiring very little sub-structure, but offering excellent wind speed reduction, whilst allowing light to enter the building.

As the market leader in weather protection systems Galebreaker continues to develop CFD modelling techniques that can accurately model entire air cooled power plants to determine the right position and porosity of wind reduction systems. These solutions have not only improved thermal efficiency of power plants but also protect mechanical equipment from wind induced vibrations, so reducing downtime and improving mechanical performance.

In addition to the extensive installed base of ACC wind protection screens, further developments in cold weather protection screens for wet and dry cooling applications continue to assist companies with their cold weather challenges. These developments include solutions for large

natural draft cooling towers which can prevent the potentially damaging build-up of ice in and around the cooling towers that can cause disruption to a plant's operation and extensive damage to the cooling fill and support structures.

Air inlet filtration solutions provide benefits to both wet and dry cooling systems, either protecting fin coils from airborne contamination, or reducing the amount of contamination drawn into operating cooling towers, which is a valuable source of nutrients for harmful bacteria, reducing downtime and chemical usage and increasing cleaning intervals.

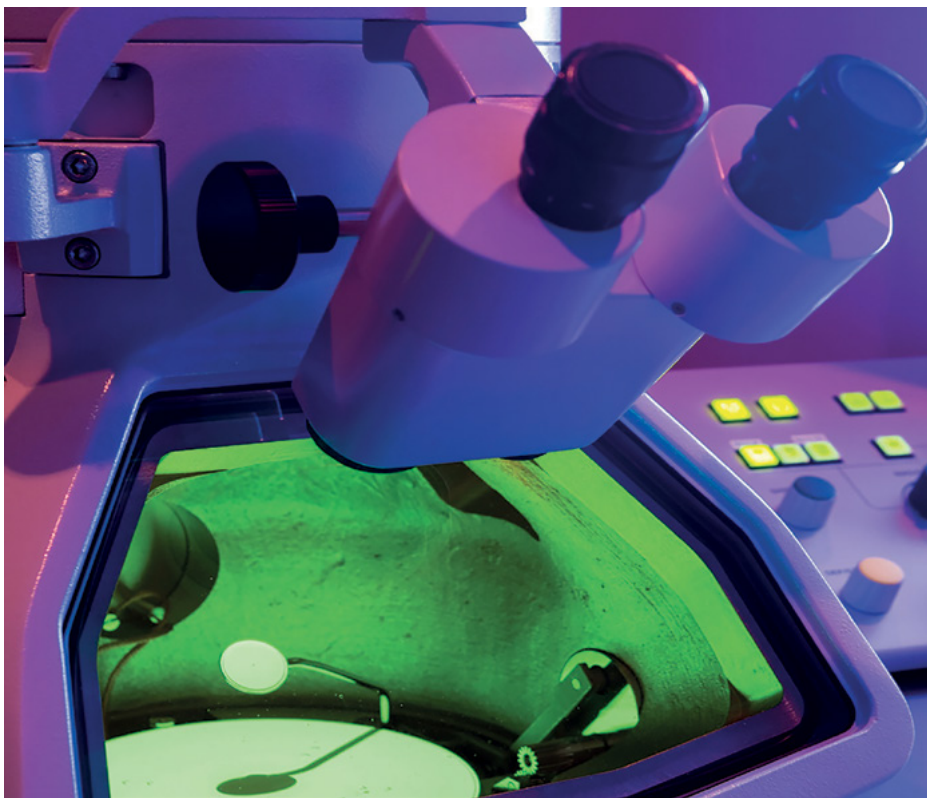
Other performance enhancement systems include plume abated cooling tower rolling doors, that are

With an extensive range of fixed and rolling systems, manually or automatically deployed, a full range of mesh screens to suit any application, and full engineering and installation services, there is a solution to help any organisation with performance enhancement through wind reduction, weather protection or air inlet filtration.

For a copy of the Galebreaker Cooling Solutions brochure or more information call DHD Cooling on 01905 317370, email info@dhdcooling.co.uk or visit the company's website at www.dhdcooling.co.uk

Direct Drive Motors With Zero Cogging Enable Smooth Control

Zero cogging direct drive motors are providing smooth motion control for OEMs of scanning, pointing, measuring and cutting machines. In the UK, INMOCO is distributing Celera Motion's Agility Series compact frameless motors. These motors achieve high accuracy, continuous motion profiles that are required in medical, scientific, industrial and microelectronic applications.



Agility Series brushless motors deliver zero cogging, low torque ripple, and minimal vibration, which creates smooth velocity control and high accuracy positioning. Featuring a slotless profile, this removes the cogging jerk associated with slotted motors and instead, provides highly controlled torque flow.

Agility Series' magnetic design also removes peaks in torque and generates less than 2% torque ripple, creating a smooth motion profile,

particularly evident at slower speeds. This makes the Agility Series highly suited for applications requiring high accuracy at lower speed continuous torque, such as cutting.

The Celera Motion Agility Series also features high mechanical stiffness and low rotor inertia. In combination with the design of the windings and the motor's lower torque ripple, the Agility Series provides accurate control of high dynamic axes for peak-duty applications.

With a high torque density and a low-profile design, the Agility Series is available in a variety of form factors, starting at 19mm outside stator diameter. The reduced dimension design of the frameless motors enables development of a small overall machine footprint with tight integration for compact, lightweight, precision assemblies. The motor design also features a large through hole for cable routing, enabling fast and simple installation and machine build.

Celera Motion, supported in the UK by INMOCO, also works closely with OEMs on bespoke projects. Support ranges from motor customisation, including windings and form factors, through development of a complete mechatronic system with encoders, servo drives, and associated motion control technology. In-depth design consultation is available with INMOCO's engineers, who integrate with Celera Motion's applications team for solution development.

The Agility Series generates between 0.041 Nm and 15.10 Nm continuous torque and peak torque from 0.123 Nm to 45.29 Nm. The motor series is also compatible with a wide range of drives and controllers.

For more information visit:
www.inmoco.co.uk

Goodfellow Donates Essential Materials To Companies Supporting Frontline Workers

Leading research materials supplier, Goodfellow, is showing support to several initiatives in the fight against COVID-19, supplying materials that are being used to make protective equipment for frontline workers.

contributing on a local level to this global crisis.

We'd actively encourage other companies to do the same where possible.

"We know how hard our partners are working to make a positive difference amid this pandemic and we were particularly impressed with the efforts made by the teachers at Stamford School, who are showing solidarity and commitment in such uncertain times."

Teachers at the Stamford Endowed Schools originally trialled using the Schools' 3D printers to manufacture visors for NHS staff, but the process was too slow to meet demand. Instead, staff worked over a weekend to prototype and refine a design for creating face masks using laser cutters. This was then used to create the first delivery of 100 masks, manufactured in just six hours, which was sent to the ICU team at Peterborough City Hospital.



Their latest donation has seen the company donate 130 kilos of polypropylene coil to Stamford School in Lincolnshire, UK, where Design Technology teachers are voluntarily manufacturing 1,000 protective face masks a day. The school is contributing to the national effort to increase the availability of PPE for frontline NHS (UK National Health Service) staff.

Goodfellow has also donated to a number of other companies that are supplying protective equipment to hospitals, such as supplying PET sheet to Plastic Jesus Fabrication, an LA artist who has adapted his studio to make medical PPE

to donate to local hospitals. Other companies receiving donations include Royal Mint, Brammer, TJ Morgan and Safran Aero Boosters.

Stephen Aldersley, CEO at Goodfellow commented on the donations: "It's incredibly important that we come together to support each other in times like these, both industry and individuals alike.

"It just so happens that in this instance, Goodfellow has the ability to help frontline workers with the specialist materials used to make PPE – so it was a clear opportunity for us to start

Mr Newton, Head of Design Technology at Stamford School, added: "We are extremely fortunate to have the equipment and skill set to make a real difference to members of our NHS. We will keep manufacturing as long as we have materials, which Goodfellow are supporting us with, and a demand for the product - we're just glad we are able to help our amazing NHS workers."

For more information about Goodfellow materials, visit www.goodfellow.com, or contact info@goodfellow.com.

Tenmat Advanced Materials Appoints MSC Industrial Supply

MSC Industrial Supply Co. (MSC), a leading national supplier of metalworking and maintenance, repair and operations (MRO) products and services, has been appointed by Tenmat Advanced Materials (Tenmat), a global manufacturer of high-performance advanced materials and components.

decision and I am already very pleased with the enthusiasm, dedication and commitment MSC has shown from the outset.

"We also look forward to reaping the benefits of MSC's engineering support, which will help cut costs and drive efficiencies. My only regret is that we didn't do this sooner."



Sean Rudd, head of new business development at MSC, said:

"Our ability to deliver a multi-disciplined approach covering vending, engineering, product sourcing and account management, coupled with our in-depth understanding of Tenmat's business and sector, means we have been able to recommend a fully integrated solution that will streamline their operations and deliver significant efficiencies.

"By serving as an extension of its supply chain, we look forward to giving Tenmat increased visibility of what is being used, where, and how often, which will have a major impact on increasing accountability and delivering cost savings across the business."

Within the five-year contract, MSC will supply a range of commodities including tooling, PPE and general consumables, alongside ongoing engineering support, supply chain consolidation, vending solutions and the delivery of a cost-saving programme.

Based at Trafford Park, Manchester, Tenmat manufactures composite wear parts and bearing materials, high-temperature resistant materials, engineering ceramics, hard metals, and passive fire protection solutions. Its varied client base spans sectors including defence, aerospace, automotive rail, oil and gas and construction.

MSC won the contract following a competitive tender due to its capacity to provide a complete solution centred around reducing Tenmat's indirect spend.

Having previously dealt directly with many original equipment manufacturers (OEMs), Tenmat will now benefit from a streamlined purchasing process and the associated reduced costs, together with greater accountability and reporting, leading to a significant reduction in consumption which MSC estimates will be in the region of 25-30 per cent.

Julian Greenhalgh, Tenmat purchasing and commercial director, said: "MSC's knowledge of the industry and in-depth product range helped differentiate them from the competition. They have a multi-disciplined customer support team, dedicated to Tenmat, who have been very quick to respond to any queries.

"I have no doubt that we have made the right

The vast majority of Tenmat's materials are installed in safety-critical environments. With a mission to be one of the world's leading companies within its field, Tenmat consistently strives to provide its customers with advanced material solutions which ensure high levels of performance.

As well as realising cost savings and becoming more profitable, MSC's customers also benefit from world-class customer service, an unrivalled product range from industry-leading brands, expert technical support and next-day delivery as standard.

For more information visit:
www.mscdirect.co.uk

Composite Materials Manufacturer Partners With Empteezy To Specify A Customised Flammable Liquids Storage Unit

Hereford Glass Fibre was founded in 1986 and began by manufacturing seagoing expedition and sprint racing kayaks. Since then the company has continued to diversify into closed mould technology including resin transfer moulding (RTM) processes, Vacuum Assist Resin Injection (VARI), Vacupress (vacuum closed moulding) and polyurethane foam systems.

Due to the nature of their work, HGF use a range of flammable liquids and resins in the manufacturing processes and because of risks associated with these liquids, they went to the market and sought suppliers with the credentials to provide a fully compliant storage unit to meet their specific requirements, and to that end chose Empteezy.

Following an initial consultation and site survey, it became apparent that HGF would require a customised bunded storage unit that would fully comply with Dangerous Substances and Explosive

Atmospheres Regulations (DSEAR) 2002; ensure the liquids and resins are fully bunded when in storage and also satisfy the requirements of their insurance company.

Empteezy's customised solution included; shelving specifically designed to hold the different sizes of containers used on-site and specialist pipework connection points to allow for the transference of resins from stored IBCs to an external collection point. Over and above the customisation work, the unit was also fitted with explosion relief panels and an earthing kit.



Managing Director, Dillon Muir stated "I am extremely happy with the unit and levels of customisation Empteezy were able to provide, the unit ensures we are working to the highest standards of health and safety when storage flammables."

For more information visit:
www.empteezy.co.uk

Launch of Celeros Flow Technology radically alters flow technology sector

Celeros Flow Technology has been launched as a standalone company following the divestiture by SPX FLOW, Inc. of its Power & Energy division to an affiliate of funds managed by private equity company Apollo Global Management, Inc.

Commenting on the launch of the new company José Larios, CEO of Celeros Flow Technology, says:

"Celeros Flow Technology has been established with the objective of radically altering the flow technology landscape. Our aim is to serve as a full-lifecycle optimization partner and as an experienced advisor to our customers on all matters concerning the world's critical flow systems.

"By leveraging the talent, experience and enthusiasm inherent in our team, we deliver superior mission-critical flow control technology and services that extend the long-term effectiveness of our customers' systems, boost productivity levels, reduce operational

expenses and maximize return on investment."

Celeros Flow Technology is focussed on supporting customers operating in diverse end markets such as: conventional, renewable and nuclear power, oil and gas (both onshore and offshore), petrochemical processing and water treatment; as well as those building and operating marine vessels for commercial and defense applications.

The Celeros Flow Technology portfolio comprises the M&J Valve, ClydeUnion Pumps, Copes-Vulcan, Plenty, Dollinger, Vokes, Airpel, and GD Engineering brands. Together they employ more than 1800 people



at 20 sites globally, representing hundreds of years of experience in delivering flow control solutions based on mission critical pumps, valves and filtration technology.

For more information visit:
www.celerosft.com

The new Beha-Amprobe Ultrasonic Leak Detectors for HVAC/R, mechanical and electrical inspection and troubleshooting

Beha-Amprobe has introduced new ultrasonic diagnostic tools for HVAC/R, mechanical and electrical inspection and troubleshooting, the Beha-Amprobe ULD-400-EUR Series Ultrasonic Leak Detectors.

Combining advanced filtering technology with wide ultrasonic frequency response, the ULD-400-EUR Series allows users to quickly and easily locate gas leaks in the most noisy and challenging environments. They are ideal for testing compressed air systems, plumbing, electrical and mechanical systems, valves tanks and pipes, heat exchangers, boilers and condensers, air conditioning and refrigeration systems, and motors and machinery.

Compressed air is so widely used that it is often regarded as the fourth utility and it is the most expensive energy source across all types of manufacturing and process plants. Any leaks can represent a significant source of wasted energy in industrial or commercial environments and can result in unnecessary high bills.

When equipment begins to fail due to an air or gas leak or vibration, or electrical discharge, the leakage point emits an ultrasonic sound wave that is above the natural range of human hearing. The Beha-Amprobe ULD-400-EUR Series Ultrasonic Leak Detectors convert this ultrasonic sound into an audible range signal that can be used to pinpoint the exact location of the equipment failure.

The strength of the leak can be clearly seen on the large LCD display bargraph and, by listening to the converted audible sound emitted via the headphones, helps identify the source of the leak and differentiate between air leaks and electric discharges. In extremely noisy environments, where there is strong ultrasonic noise generated by running machinery or equipment, the Receiver's filter function can filter out up to three main noise frequencies which would otherwise hide the noise of the leak.



When working in unpressurised systems, or if the pressure is not sufficient to detect or verify a leak with the Receiver alone, an optional Transmitter can be used to generate the ultrasonic signal. This approach can be used, for example, to detect air and water leaks in car windscreens and side windows, in fluid and gas tanks, and in building windows, doors and roofs.

For more information on other Beha-Amprobe test and measurement products, or to download a catalogue, visit the website at www.beha-amprobe.com

C.K Japanese Pry Bar 10" (T4312) – Strong, Durable, Reliable

C.K, the leading brand from Carl Kammerling International, has been at the forefront of quality hand tool manufacturing for many years and is set to strengthen its range of Pry Bar products with the new Japanese Pry Bar 10" (T4312), a handy tool bag sized addition for easy transportation.

This premium quality Japanese Pry Bar features a 46mm wide tip for precise removal with minimal damage of mouldings, skirting boards, cavity wall nails and is also perfect for quickly prising apart floor boards and other materials.

Strength and Durability

Hot forged from carbon steel alloy and hardened for exceptional strength and durability, this high performance pry bar is designed to achieve the best results quickly and easily and conveniently

slots into any tool bag. Ideal for a multitude of tasks, whether electrical, building renovations/DIY work, or for industrial applications, the new C.K Japanese Pry Bar is set to become an essential addition to every professional's tool kit.

Tina Skinner, Marketing Director at C.K Tools comments: "Our research with trade professionals gives us great insight into what works best, with the increasing demand for a quality wide tip tool bag sized pry bar recently identified. The new C.K Japanese Pry Bar not only delivers the high



quality required by busy professionals to complete a variety of tasks, but also provides customers with the opportunity to maximise sales by offering an additional price competitive option."

For further information visit www.carlkammerling.com or call 01758 704704.

Belzona 4411 (Granogrip) – For the prevention of slips, trips and falls

Whether in a workplace or public environment, the importance of people's safety should always be a top priority.



There are various areas that can become slippery and dangerous when in contact with water and other liquids such as production floors, ramps, stairs, loading bays and walkways. These areas can present serious injuries and costly repercussions if not treated with proper care and responsibility. In Great Britain alone, there were over 69,208 employee non-fatal injuries reported by employers in 2018/19 (RIDDOR). From that figure, 29% of those incidents were categorized as slips, trips or falls on the same level.

There are of course quick, short-term solutions for dealing with wet or contaminated areas. Flooring areas can be regularly cleaned, effective footwear can be worn, and training and supervision can be given. However, in order to significantly reduce the risks of accidents in the long-term, safety grip systems offer a hard-wearing solution that exhibits exceptional adhesion to a variety of surfaces in comparison to anti-slip tapes.

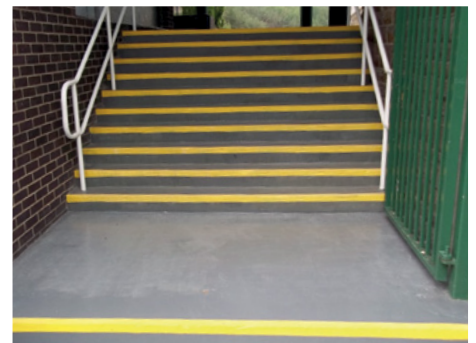
Belzona 4411 (Granogrip) is a two-part, fluid epoxy resin designed for the creation and repair of safety grip systems on walking surfaces. Used

in conjunction with an aggregate, this solvent-free material is ideal where slip reduction, adhesion, chemical or wear resistance are required. When compared to conventional grip systems such as tapes/strips, epoxy systems such as Belzona 4411 offer both performance and application benefits. Aside from the slip reduction, the system demonstrates excellent levels of adhesion, offering a long-term solution that will not peel or wear away. The system also ensures high visibility where required, available in safety yellow or grey. Once installed, the system requires no maintenance, making it a reliable choice. The positive grip system is also easily brush-applied without the need for hot work or specialist tools. The solvent-free and low-odour nature of the system also allows work to be carried out on-site in public areas.

The following example demonstrates the systems ability to not only upgrade an areas appearance and visibility, but to also offer a long-term, non-slip solution. Numerous step nosings at the main entrance of a secondary school had become damaged over time with a loss of surface material.



Before



After

In the original state of the stairs, there was also a lack of visibility. The school wanted the main entrance upgrading and wanted to ensure the steps were safe for its staff, pupils and visitors. Once the concrete step nosings were rebuilt using a Belzona concrete repair composite, Belzona 4411 and aggregate were applied by brush, with the application area taped out to ensure a neat application. The completed application meant there was a drastic reduction in the risk of falls or related injuries due to the increased traction this system offers.

Belzona 4411 (Granogrip) is the ideal solution for creating a safer environment in workplaces and public environments. The system is proven to be long-lasting, providing better performance over conventional methods such as adhesive tapes and strips.

For more information on the system, visit www.belzona.com/4411.

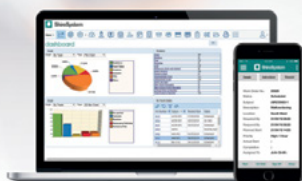
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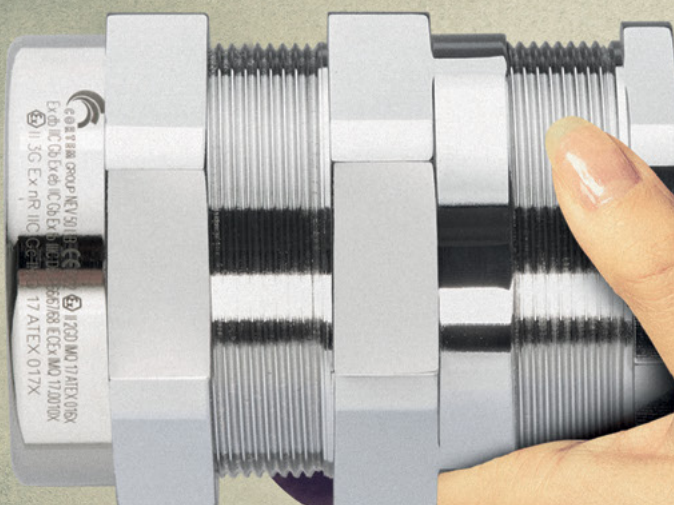


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