

Reducing reagent costs for in-vitro diagnostic equipment

Modern healthcare relies on clinical and biological analysis of samples to deliver accurate diagnoses and provide targeted treatment for patients. Much of the equipment used to perform the analysis uses reagents and cleaning fluids to establish accurate results and prevent cross-contamination. The efficient handling of reagents can therefore contribute toward cost reduction and increased service availability.

Tony Brennan, Field Segment Manager, .gas & .micro at Bürkert, looks at how the running costs associated with this equipment can be minimised.

The analysis of blood, saliva and other body fluids offers vital information for medical diagnosis and as such, the machinery involved in establishing the results often runs 24/7 to keep up with demand. Reliability, both mechanically and in terms of analysis accuracy is of paramount importance and this is why the design of the analysis equipment is placed under such scrutiny.

At the same time, manufacturers want to improve productivity and reduce operating costs where possible for their customers. While fundamental designs and processes remain unchanged, refinements in the components and their layout can achieve a significant reduction in reagent costs and minimise downtime for maintenance.

Reducing costs

With the high cost of reagents, reducing the expenditure on this input can have a significant impact on the running costs of the equipment. Furthermore, if the scale of the machine can be reduced then additional equipment can be added to the laboratory, making it more productive.

Advances in analysis technology are making the testing procedures more efficient, reducing the amount of reagent required; all that is needed is a modified control process that can accurately handle the reduced volumes.

With the need to reduce the size of analysis machinery and make it more efficient, the focus within the industry is on miniaturisation, and multi-tasking, both of which will enable laboratories to achieve more with less.

Design refinement

The most common type of project within the sector is the modification of existing equipment. The analysis process is usually perfectly understood and documented. What is required is a refinement of the current machine that will make it more efficient and more cost effective.

By creating partnerships between the analyser OEMs and the process control experts, it is possible to work together and develop solutions as well as all the certifications required to operate the machinery in the medical industry. This enables OEMs to take advantage of new technologies that have made control valves smaller or with longer service lives.

At the same time there may be an opportunity to make the equipment more accessible for maintenance and reduce the number of fluidic connections and therefore potential leak paths. This also offers the opportunity to simplify the variety of parts used and reduce the number of suppliers involved in the project.

Manifolds for optimised performance

Implementing process control manifolds that take advantage of modern manufacturing techniques and materials can deliver a number of advantages in day-to-day operation, not least the reduction in possible leak paths. By reducing the amount of pipework required within a machine, a manifold also makes for a much cleaner and more efficient installation.

Manifolds are comprised of several individual components, such as valves, fittings, seals, sensors, as well as the manifold block itself. Using a specialist manufacturer to create the complete assembly makes for a much more efficient process and also reduces the burden on the maintenance engineers, who may need support from the manufacturers involved in the delivery of the analysis equipment.

Manifolds can also significantly reduce downtime in the event of an operational issue. Rather than spending time fault-finding and trouble-shooting, the complete manifold can be quickly removed and replaced, allowing the machine to return to normal operation quickly.

In the meantime, the issue can be investigated further and resolved without the additional pressure of a backlog of tests stacking up. The manufacturer can spend time gathering any additional information that may help to improve the design for the future.

Cleaning for success

In almost all analysis machines, it is essential to effectively clean all the relevant surfaces between each test to prevent any cross-contamination. This process can involve expensive chemicals and any delays in completion will reduce the operational efficiency of the analysis equipment.

Using modern computation flow dynamics (CFD), it is possible to optimise the cleaning cycle by creating a manifold with valves, fittings and sensors that minimise dead areas. By reducing the time required for the cleaning process, the time delay between analyses is minimised and productivity is increased.

In each case, the chemical resistance properties of seals and diaphragms should be properly assessed to ensure their suitability for the task. Operational reliability is of paramount importance in this field and that includes the maintenance cycles as well as the actual analysis processes.

Leading the field

Analysis machines operate 24/7 to keep up with the demand and it is essential that every component delivers unfaltering reliability. The fluidic management system is the heart of the equipment and proving that a combination of valves, seals and manifolds can deliver this reliability requires expertise in the design, manufacture and testing of fluidic control systems.

By working with fluid control experts, such as Bürkert, it is possible to optimise an existing design in terms of performance and reliability. Using a combination of standard products and bespoke manifolds, a unique solution can be delivered that is tailored to a specific application.

In this way, OEMs can enhance their reputation by leading the field in terms of clinical analysis, whilst at the same time improving productivity and reducing the cost of operation.

Image Captions:

Image 1: Modern healthcare relies on clinical and biological analysis of samples to deliver accurate diagnoses and provide targeted treatment for patients.

Image 2: By creating partnerships between the analyser OEMs and the process control experts, it is possible to work together and develop solutions as well as all the certifications required to operate the machinery in the medical industry.

About BURKERT

Burkert Fluid Control Systems is one of the leading manufacturers of control and measuring systems for fluids and gases. The products have a wide variety of applications and are used by breweries and laboratories as well as in medical engineering and space technology. The company employs over 2,500 people and has a comprehensive network of branches in 36 countries world-wide.

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Editor Contact

DMA Europa Ltd. : Brittany Kennan

Tel: +44 (0)1562 751436

Fax: +44 (0)1562 748315

Web: www.dmaeuropa.com

Email: brittany@dmaeuropa.com

Company Contact

Bürkert Fluid Control Systems : Kirsty Anderson

Tel: +44 (0)1285 648761

Fax: +44 (0)1285 648721

Web: www.burkert.co.uk

Email: kirsty.anderson@burkert.com