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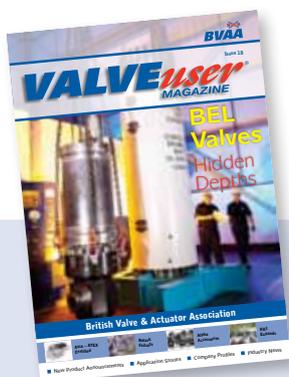


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VALVEuser® is a controlled circulation magazine, free of charge to genuine users of valves, actuators and related products and at the discretion of BVAA Ltd.

Cover: 15,000 psi, 5 1/8 inch valve following successful completion of ultra-deep water tests - BEL Valves.

Off to Offshore!

Welcome to this latest edition of Valve User magazine, which has been produced especially for Offshore Europe 2011.



by BVAA Director, Rob Bartlett

‘OE’ - the bi-annual Oil & Gas Conference & Exhibition in Aberdeen – has been on the lips of many in the industry for some time, and is always eagerly awaited! Although British valve and actuator suppliers are highly proficient in all applications and end-user industries, there’s no doubt that the Oil & Gas sector, particularly offshore, has become the favoured customer-of-choice for many suppliers.

‘Offshore’ has frequently been regarded as a welcome refuge when times are leaner elsewhere. Being a mature sector, the oil and gas reserves in the less taxing, shallow, easily accessible locations around the world have largely been depleted, and the future for the industry will inevitably be in the very deep, aggressive environments, with higher pressures and temperatures – all areas where British valve and actuator companies already excel.



Offshore Europe
Oil and Gas Conference
and Exhibition

6th-8th September 2011 | Aberdeen | UK

On the subject of ‘less taxing’, for the second time in just a few years, I find myself bewildered by the UK Government’s policy of plundering the oil and gas industry for tax revenue one minute, then applying ‘tax relief’ the next! This ‘relief’ is invariably after the damage has been done by the preceding tax.

On my first OE visit, Gordon Brown announced a ‘windfall’ pillage of the sector, single-handedly stultifying a North Sea recovery at the time.

Oil prices have been up and down like a yo-yo recently and market conditions dictate when investment in new exploration/finds is viable. Add to that mix the unpredictability of variable tax and it becomes apparent why – despite the obvious, increasing demands for oil and gas – investors hesitate. We really must ensure there’s a much more predictable environment for our local offshore industry to develop and grow.

BVAA will of course be exhibiting at OE – we look forward to welcoming Valve User readers to our stand, 2D05, and very much hope you enjoy this special edition!

Did you know?

As well as a printed copy, VALVEuser magazine is also available as an email attachment, and as a download from BVAA’s website, www.bvaa.org.uk

STOP PRESS!

BVAA is launching a new course entitled ‘An Introduction to Managing Commercial Risk, Contracts & Agreements.’ Further details can be found on page 6.



BVAA welcomes users’ views and articles.
Submissions to rob@bvaa.org.uk

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We have been assured that no Rabbits were harmed during the production of this photograph and that Bluebell (shown above) was rewarded for her time.



BVAA News

Mad Hatters

How far can you go wearing a BVAA Hat?

We never ceased to be amazed at how well travelled the BVAA Hat has become! Here Dave Bowen, Business Development Manager for Shipham Valves, is photographed... well where? There's £50 for the charity of your choice if you are the first person to supply the correct answer. Entries to rob@bvaa.org.uk

Our congratulations to Anthony Martin, Valve Solutions Ltd, for correctly identifying Rob Bartlett was photographed last time at Caernarfon Castle, Gwyned. £50 goes to 'The Bradford Players.'



Managing Commercial Risk

The BVAA is launching a new course entitled 'An Introduction to Managing Commercial Risk, Contracts & Agreements.'

This one day training session is designed to raise awareness of key commercial risks and how to address them in practical terms. Topics covered include evaluating opportunities for level of risk, pricing, volumes, specification and warranty, liabilities, intellectual property and payment terms.

Confidentiality, Supply and Development Agreements are all addressed, in the context of stages in the relationship and business with customers, and with the focus on practical issues.

There is a section on preparing for negotiations, which links effectively to other sales/negotiation training material.

The course is aimed at Key Account Managers, Sales and Commercial Managers, Product and Marketing Managers, Sales Engineers, Technical/Technical Sales Managers and their teams, and will also benefit Customer Service Managers.

It is equally relevant for specific sector and general business and should be an integral element of induction training for new starters in the above roles.



'Go ahead and sign, we'll sort the details out later.'

The training is a mixture of presentation, case studies and group participation, and delegates will leave with a comprehensive "tool kit" of material to apply in practice.

The material has been prepared based on real customer experiences worldwide over the past 5 years, with additional inputs from third party commercial and intellectual property lawyers and liability insurance specialists.

The course, tailored to our industry, will be delivered on Monday 10th October 2011. Costs are £395 +vat for members (£450+ vat non-members).

For more details contact Karen@bvaa.org.uk

Multi-Event at Celtic Manor!

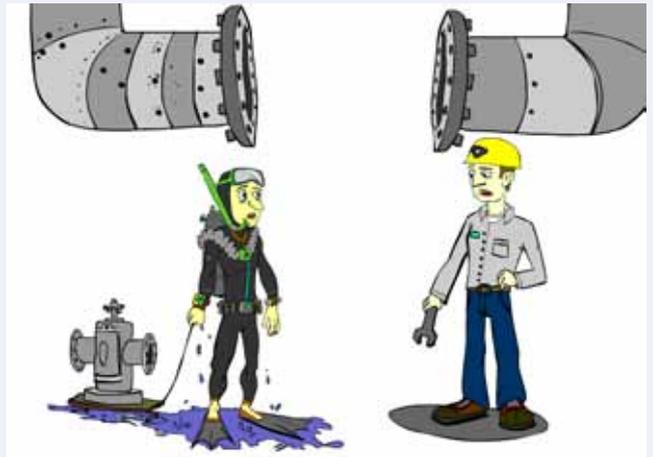


Members at the inaugural Golf Society day were (from l to r) Andy Will, Mark Shipp, Tom Bartlett, Bill Whiteley, Rob Bartlett, Joe Kelly, Peter Everett (c), Peter Churm, Dave Jones, Geoff Newman, Peter Burnett and Rhys Jones.

On the 6/7th July, BVAA combined a regional meeting and dinner with the Association's management meetings at Celtic Manor, Newport, Wales. The venue proved a real hit with members, and the Association was able to organise – at long last! – a very successful Golf Day on the picturesque Montgomerie course.

Balls were kindly sponsored by James Walker Seals and HSP, with HSP also generously donating the prizes! Peter Everett led his team to victory in the Stapleford competition. It has been agreed that BVAA will now form a new Golf Society with the aim of organising 2/3 events every year. Anyone interested in joining the society should contact rob@bvaa.org.uk.

Combined BVAA / BSI Valve WG Meeting



A 24" valve? BVAA & BSI make standards work

On 12th July, BVAA hosted another combined meeting of the BVAA and BSI valve technical groups at BVAA HQ, Banbury. Following on from similar recent events, this meeting merged the activities of BVAA and BSI into one session with one agenda, saving participants the considerable hassle of the two separate meetings that would otherwise have been necessary.

Chaired by BVAA's Peter Churm, the meeting included reports from all the various valve and actuator committees, at BSI and BVAA, and covered national and international standards matters affecting the industry.

BVAA Expands!

Due to increased demand for the BVAA training courses, we have recently agreed to double the size of the BVAA HQ in Banbury.

The existing offices will be converted into a larger training suite, and the recently acquired ground floor will now house the expanded BVAA staff.

Centrally located at Banbury, on the M40 motorway, the new Training suite will be available for hire by members, and will comfortably accommodate 32 in classroom and boardroom style, and potentially up to 70 theatre style, making it a very convenient and cost effective solution for members' own meetings. For booking details or for more information about BVAA's expanded training portfolio, contact karen@bvaa.org.uk



BVAA expands to fill the building.



The proposed Group Stand at Valve World.

Valve World 2012, & VW Americas 2013

BVAA have already made plans for a BVAA Members-only Group Stand at Valve World Dusseldorf in 2012, but following on from the success of the VW Americas show, it is also our intention to attend the 2013 running of that event. Contact BVAA for further details of how to take part.

BVAA More New Members!

BVAA membership continues to grow and grow. Our latest recruits include: -



Andrew Harvey of Robert Cort, Flow Group



The Mogas team, from left to right: Jason Stevens, Gerard Breen, Alex Pollock, Richard Glover, Jane Pitchford and Dean Roberts



Southern Valve



BVAA welcomes users' views and articles. Submissions to rob@bvaa.org.uk




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Adanac completes 1000th Fugitive Emissions test

On 7th July 2011, Adanac carried out our 1000th Fugitive Emissions test. After completing our first test in May 2004, we have never looked back!

'Fugitive emissions' are emissions of gases or vapors from pressurized equipment due to leaks, and is the collective term for all leakage from a valve to the environment. In addition to the economical cost of lost commodities, fugitive emissions can substantially contribute to air pollution and climate change, whilst also harming the environment. However, fugitive emissions present other risks. Emissions of certain compounds from Oil refineries and chemical plants pose long term health risks to both workers and local residents alike, and when flammable liquids and gases are contained under pressure, any leaks increase the risk of fire or explosion.

Leaks through pressurized process equipment generally occur through valves, pipe connections and other related equipment. With regulation becoming ever more stringent, valve manufacturers and

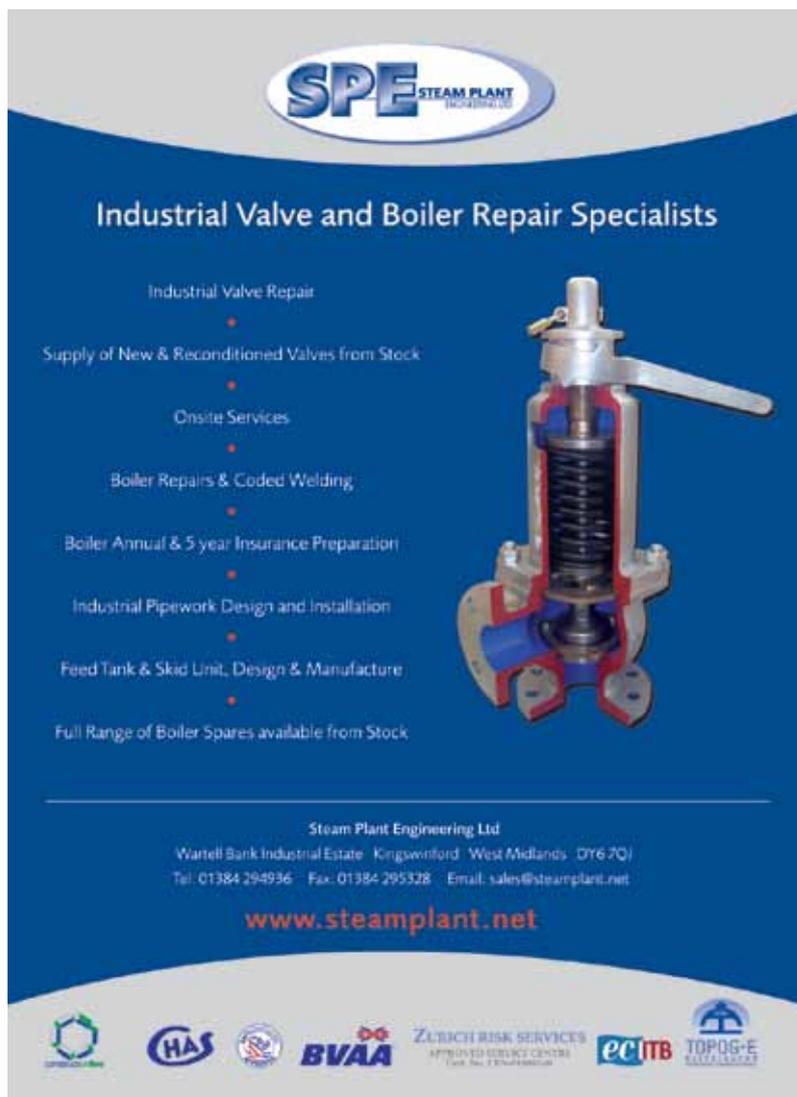


Fugitive emission test performed by Adanac

site engineers alike are recognising the need for emissions testing of valve product.

Over the years, Adanac has tested the fugitive emissions of valves of all types and sizes at our in house test facility; from 1/4" Needle Valves to 16" Gate valves, although our capacity does not end there. In addition to testing valve types such as Ball, Gate, Globe, Butterfly, Needle and Check Valves, Adanac has also tested Double Block and Bleed valves and a number of manifold Assemblies. Using specifications such as BS EN ISO 15848 parts 1 & 2 and Shell SPE 77/312, Adanac can undertake prototype and production tests up to ANSI Class 1500.

We look forward to the next 1000 tests!



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EPSG Ethernet POWERLINK Conference visits the UK

Free conference shows how a consistent and well integrated solution of robotics, machine vision, pneumatics and motion and control, could boost your automation performance



To promote the benefits of Ethernet POWERLINK connectivity, the Ethernet POWERLINK Standardization Group (EPSG) is holding a series of conferences across Europe. ASCO Numatics, together with three other market leading companies, are organising the event. During the conference, ASCO Numatics will be demonstrating how its latest G3 electronic valve island with POWERLINK interface can be networked to create integrated solutions.

The UK event takes place on the 16th November 2011 at the National Motorcycle Museum at Solihull near Birmingham. Themed "POWERLINK on tour with Industry Leaders", the conference shows how a consistent and well integrated solution of robotics, machine vision, pneumatics and motion and control could boost automation performance.

Ethernet POWERLINK provides the user with greater speed, bandwidth and flexibility. Participants will learn about the benefits of "Integrated Automation" and how industrial Ethernet technologies, more particularly POWERLINK, permit this integration with best performance.

Organised by ASCO Numatics, B&R, Stäubli and Cognex, the one day conference will consist of a mix of presentations, technical workshops and live demonstrations.

For more information about the conference programme, including details of how to register and a full list of dates and locations, please visit www.conferences.ethernet-powerlink.org

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Emerson enhances control valve sizing & selection software

Fisher® Specification Manager software update adds flexibility and speed

Emerson Process Management has released an updated version of its Fisher® Specification Manager software, enhancing ease of use and adding flexibility to this widely-utilised valve selection tool.

Designed for engineers who select and specify control valves, the Fisher Specification Manager software package features a clear, sequential process to such tasks as building ISA specification sheets, predicting valve operating noise levels, and exporting dimensional data for Fisher and Baumann™ control valves.

Enhancements to the Fisher Valve Specification Manager software include the addition of a port diameter attribute to the trim details grid as well as updated product data and literature. The newly revised Fisher IEC valve sizing engine now includes inlet temperature for liquid sizing, while faster download and installation of software changes are now possible thanks to a new quick update feature within the Help menu. A "What's New" menu option allows one-click access to the latest software changes.



Emerson has released an updated version of its Fisher Specification Manager control valve sizing and selection software

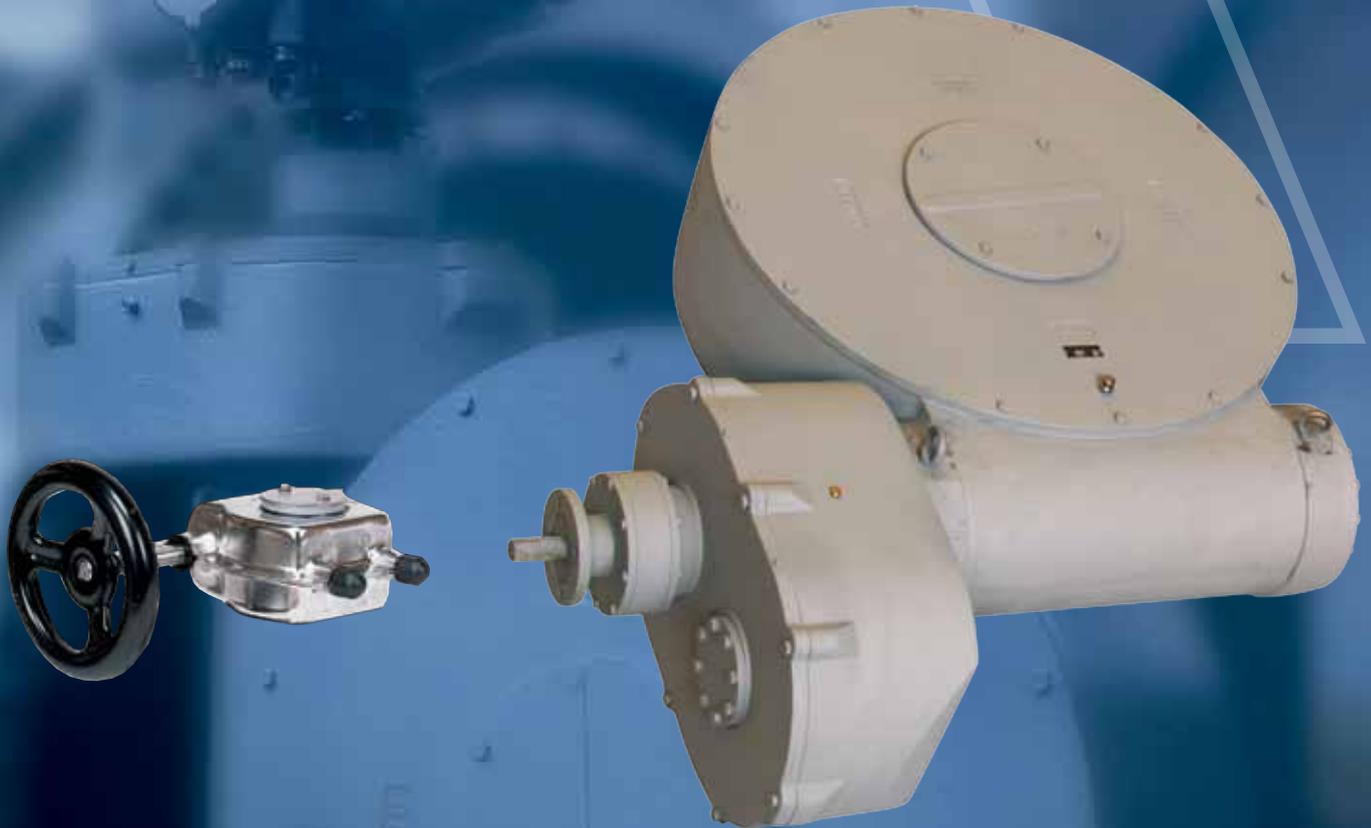
The Fisher Valve Specification Manager software is compatible with Windows XP, Windows Vista and Windows 7 operating systems and the latest version can be downloaded from www.FisherSpecificationManager.com



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Flowserve Announces Limitorque QXM Smart Valve Actuator

New Design Helps Lower Total Cost of Ownership for a Variety of Applications

Flowserve Corporation, a leading provider of flow control products and services for the global infrastructure markets, recently announced the availability of the Flowserve Limitorque QXM smart valve actuator.

The Limitorque QXM is designed for rising stem valve applications, including choke valves and small control valves in the upstream oil and gas, water, fossil fuel and renewable power markets. Important features of the Limitorque QXM include:

- The QXM is a smart electronic valve actuator available with either 6.5 total turns, or a maximum of 20 total drive sleeve turns. This is especially important for small valves that require limited travel and maximum control.
- The QXM encoder employs system-on-chip technology which permits redundant, 12-bit resolution over 20 total turns, or an accuracy of less than two degrees of drive sleeve rotation. This redundancy is part of the built-in self-test feature of all Limitorque smart actuators. This positioning resolution makes the QXM one of the most accurate actuators on the market today.
- The QXM utilizes an innovative brushless direct current (BLDC) voltage motor. This motor design meets most global voltage requirements. This unique feature is an advanced technology that helps eliminate sparks, reduce mechanical and electrical noise, and dissipate heat better than direct-current motors with brushes. The brushless motor is designed to last longer than conventional motors and allows for more accurate positioning.

The BLDC motor, in conjunction with the absolute encoder, helps provide the precision users are demanding in their processes.

The Limitorque QXM is available for multi-turn valves that require a minimum of 18 lb. ft./24 Nm to a maximum of 250 lb. ft./337 Nm torque and from 3-24 RPMs.

"The introduction of the Flowserve Limitorque QXM underscores our commitment to creating engineered solutions that help lower the total cost of ownership and increase plant uptime," said Bill Lyon, director, research and development, Flowserve Flow Control Division. *"The QXM is designed to offer reliability and long life in applications that require an uninterrupted power supply."*

The QXM is the latest addition to the Flowserve next generation of smart valve actuators, which includes the Limitorque MXa and the Limitorque QX. There are more than one million Limitorque actuators installed around the world. They serve a wide variety of applications and are supported by a worldwide network of Flowserve Quick Response Centres and service centres.



Flow Control

Flowserve Flow Control

Tel: 01444 314400

Website: www.flowserve.com

CRANE Energy Flow Solutions® Relocates Headquarters

CRANE Energy Flow Solutions® is pleased to announce the new location of its head office to 4526 Research Forest Drive, Suite 400, The Woodlands, TX 77381 (USA). The new 20,000 square foot space will accommodate nearly 100 employees, and will also feature a dedicated area designed specifically for hosting internal and external training sessions.

"The relocation of our main office represents growth and it will facilitate cooperation and efficiency internally, enabling us to better serve our customers," said Kevin Olsen, COO, CRANE Energy Flow Solutions. *"We have always valued the close proximity to the global industry that our Houston-area headquarters*

provided, and the new office allows us to continue to provide that benefit."

While the ship-to address has changed, all phone numbers will remain the same.



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ARC Energy

Increasing the life expectancy of valves & actuators

Corrosion is the ultimate dirty word, leading to a waste of precious natural resources and creating problems for those entrusted with the processing and handling of aggressive liquids and ecologically damaging toxins. So what can engineers in the oil & gas, defence, power generation, marine, chemical and other processing industries do to ensure the integrity of the internal surfaces and maintain an efficient and reliable service, when the transported media can, for chemical or mechanical reasons, degrade valves, actuators and other equipment?



In such applications, what techniques are available to enhance the life of new plant or refurbish worn or corroded equipment; and what are the cost benefits compared to expensive base materials and/or replacement parts?

Engineers have a number of options when considering corrosion protection. However, the final solution will depend in part on an evaluation of factors such as the presence of chemically aggressive compounds; the level of suspended solids, if any, in the product; the installation deadline; and budget restraints. Where budget is not a constraint, engineers can simply specify valves and actuators in corrosion or wear resistant alloys known to withstand the specific service conditions. However, this is rarely the case and other, more cost-effective options must be sought.

Where standard, carbon steel valves and actuators are used, weld overlay cladding is certainly the most versatile option, providing the assurance of a heavy-duty metallurgically-bonded protective layer that will not be undermined or dislodged in service.

After first identifying the areas within the equipment that need to be protected, and the properties of the medium from which protection is required, engineers can choose from a number of welding processes and a wide range of cladding alloys. The final choice will depend on the size and geometry of the components to be clad and the alloy best suited to combat the surface degradation, whether from corrosion or erosion.

This is also true when weld overlay cladding is used to protect oilfield valves from corrosion. As oil and gas wells are sunk deeper and produce hotter and more aggressive 'cocktails' of corrosive media, equipment manufacturers are forced to specify highly alloyed materials for valves and associated components to overcome the inevitable corrosion problems. Carbon and low alloy steels through to stainless steels are all capable of being overlay clad to provide corrosion resistance in specified areas, or indeed over all surfaces in the case of the carbon and low alloy varieties, to provide total resistance.



Weld overlay cladding

For some applications limited corrosion may be tolerated on the body of a component manufactured from low alloy or stainless steel, provided complete integrity is assured in sealing areas. It is here that a more corrosion-resistant material can be applied using weld overlay cladding. Similarly, where total corrosion protection is required, it makes economic sense to manufacture the component in a cheaper alloy and overlay clad with a corrosion-resistant alloy, rather than manufacture the whole component in a more expensive, highly alloyed material.

In a typical example of the application of weld overlay cladding, Arc Energy Resources applied a coating of corrosion resistant alloy to protect a brand new oilfield valve and refurbish an old one. As the dual valve bodies were handling aggressive oils or gases that corrode the surface of the steel, the specification for both included a corrosion and wear resistant weld overlay cladding to their inside diameters.

Arc Energy applied a weld overlay cladding of Inconel 625 to all three bores of a new 5½" valve. The main bore of a 5" valve, which had been eaten away by sour gas or oil, was first machined to remove the corrosion, and then coated by Arc Energy before the bore was machine-finished to its original specification.

The choice of coating chemistry is vast; and the processes available extend from the lowly manual metal arc to multi head hot wire TIG to laser and

beyond! Many previously 'difficult to weld' materials are now commonly welded with consistent success. Arc Energy has developed an extensive library of weld procedures and welder qualifications, certified in accordance with international standards including ASME, API, ISO, DNV, Norsok, MIL and many others. A comprehensive range of base metal/overlay combinations are covered, including carbon and low alloy steels, martensitic, austenitic, 22Cr duplex and 25Cr super duplex stainless steels, nickel and copper based alloys. Its weld overlay cladding has been widely implemented in a wide variety of markets.



In fact, the development of the cladding process is such that acceptance standards for the cladding material are identical to those for the base material and can therefore be applied specifically to the areas under attack, eliminating the need to produce a whole component or item of plant from an expensive corrosion resistant material.

However, the overwhelming advantage is its versatility. Whatever the shape or size of the equipment or component there is a process that can be applied and an alloy to counteract the different levels of corrosive attack. Weld overlay cladding is a proven and recognised cost saving technology that is already well established in the oil & gas industry and engineers in these extreme environments are sharing the significant benefits, both practical and financial, of increased life expectancy.

And finally a caveat: it is important to use a cladding provider that holds ISO 3834-2 and employs the services of a proven European Welding Engineer.



ARC Energy Resources Limited
Tel: 01453 823523
Website: www.arcenergy.co.uk

BEL Valves - Going in deep

by Chris Williamson, Director of Product Development

Oil and gas operators are increasingly seeking to explore and develop reserves in deeper waters, at higher pressures and temperatures and in more onerous conditions. But what are the factors driving these developments and how is one of the leading high integrity valve manufacturers managing the changing requirements?

Certainly one of the major drivers is the fact that offshore production in the world's mature basins has declined and therefore attention has been increasingly focussed on the deep water 'heavy weight' regions of Brazil, West Africa and the Gulf of Mexico. Other significant discoveries are also being seen in South East Asia, Australasia the Mediterranean as well as the west of Shetland – a focus that hasn't gone unnoticed at this years' Offshore Europe which for the first time will have a dedicated 'Deep water zone'.

Oil price is, of course another factor driving the momentum for these developments. With a steady rise in oil price since 2000, marginal fields, longer tie backs and deep water developments have become far more attractive propositions.

A third influencing factor is the development of ever advancing technological capabilities and BEL Valves Ltd has positioned itself very much at the forefront of this technology in the high pressure, ultra-deep water range of the market.

So what are BEL Valves doing to deliver solutions in this arena?

Well you can't fail to have noticed the front cover shot. BEL Valves are leading the way in delivering ultra-deep water, high pressure valves to some of the largest developments in the Gulf of Mexico with the valve pictured having just successfully completed tests at a simulated seawater depth of 10,000 feet (3048m). The qualification valve has already passed its set of performance tests and now has certification to the

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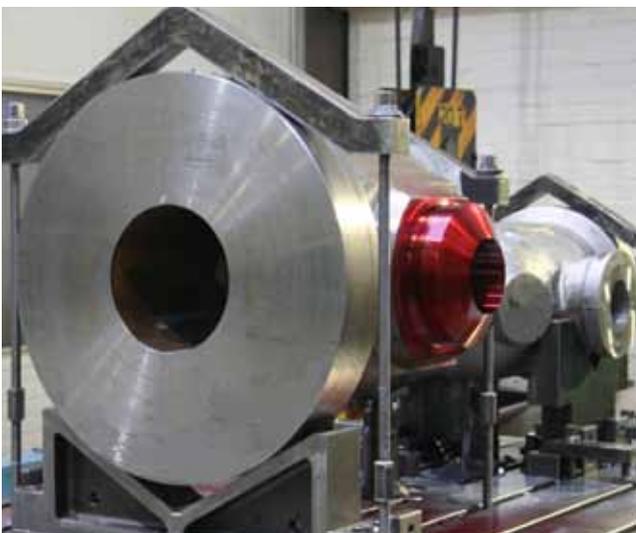
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Ultra-deep water valve during dye penetrant inspection.

latest edition of API 6A PR2 and API 17D (ISO 10423 & ISO 13628 respectively).

With all new developments like these there must be a robust set of qualification tests to prove the technology. Any organisation wanting to drive innovation in this high integrity arena has to be prepared to carry out these comprehensive qualification tests, and will often be breaking new ground as pressures get higher and the water gets deeper.

And with these deeper waters comes an increased focus on reliability. The Oil and Gas Industry's reliability requirements have always been rigorous but now when dealing with deeper water equipment, which is inaccessible for repair, this focus is critical.

BEL Valves design solutions have been born from incremental developments in deep water, tried and tested over a number of years. The confidence that this brings to BEL Valves' customers cannot be overrated especially when considering reliability and longevity. At such depths if something goes wrong the field

may stop producing for some time, so operators will choose suppliers whose products have a long and reliable pedigree at depth and proven reliability data to back that up.

Having secured orders to deliver ultra-deep water, high pressure valves, BEL's hard work and commitment has paid off, and it seems that this is just the beginning. The ultra-deep water developments opening up across the globe offer significant opportunities, with predicted global capital expenditure on deep water projects forecast at \$167 bn up to 2015.

BEL Valves will be exhibiting at Offshore Europe in September where you will be able to see some of the developments that have been made and learn more about the qualification tests required to deliver reliability at these depths and pressures.



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CPI - Composite Valves Come of Age!

With 32 Years of continuous production and over 300,000 valves in use worldwide, CPI's supplier Nil-Cor have built up a wealth of experience.

Since making its first Composite Ball valve in 1977, Nil-Cor has continually provided lasting solutions to difficult valve applications. Experience gained over the years has resulted in the compilation of a comprehensive guide to chemical resistance, and the development of a range of resin systems to meet the needs of handling different chemicals. As a result, Nil-Cor valves are manufactured with a choice of five resin systems and six seat options.

The resin systems comprise glass or graphite fibre reinforced vinyl ester; glass or graphite fibre reinforced novolac epoxy, and glass fibre reinforced polysulphone.

Utilising these resin systems, Nil-Cor produce ANSI class 150 Flanged Ball Valves 1" to 6"; Three-Piece Threaded Ball Valves ½" to 2"; Butterfly Valves 3" to 42"; and Check Valves 1" to 12".

CPI Group, based in Nottinghamshire, have been the Nil-Cor distributor in the UK and Ireland for 10 years.



Bob Osborne, business development manager for CPI Group said, "To ensure long and trouble free valve service, it is essential to select the most suitable materials, and having so many Nil-Cor options available means there are few chemical applications for which we can't offer a suitable valve solution."

"And, if you want a composite valve actuator," Bob concluded, "CPI Group can do that as well."



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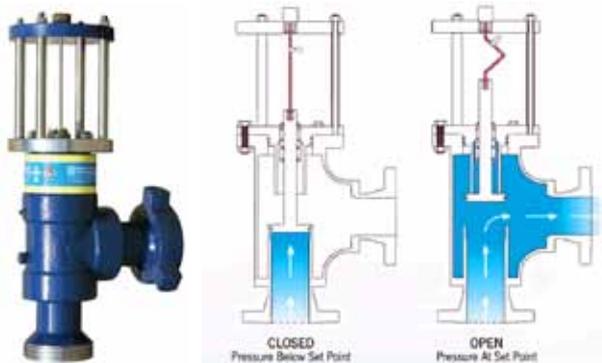


New Era for Econosto in the UK

A lot happens in two years. At the last Offshore Europe exhibition in 2009, no-one at Econosto UK could have predicted the deluge of new product opportunities that was to come. Dutch company SHV Holdings had just purchased the ERIKS group, Econosto's parent company. Since then the rapid acquisition of valve and instrumentation companies across the USA and Europe has opened up many possibilities for Econosto UK including becoming the UK distributor for Smith Valves and AMG Pesch Actuators.

Significantly, early 2010 saw changes in the Aberdeen branch which brought onboard several new faces and fresh ideas for business development. One of the results of this was an agreement reached with USA company Taylor Valve Technology Inc. for Econosto UK to become the UK and European distributor of Rupture Pin Advanced Safety Relief valves.

More widely known in the US than Europe, the Rupture Pin valves represent the most up-to-date technology in safety relief valves and demonstrate significant advantages over rupture disc products. And with safety top of the industrial agenda due to accidents and natural events in the last two years it's a product well worth taking a closer look at.



Rupture Pin – how it works

The valve works by utilising a pin (known as the buckling pin) which holds in place a piston on a seat which has a bubble-tight seal under normal operating pressures. The pin operates according to Euler's formula that gives the maximum axial load that a long, slender, ideal column can carry without buckling. When that load is exceeded the pin buckles and relieves the pressure.

Where: F = critical force (the vertical load on the column or pin)
 E = modulus of elasticity
 I = area moment of inertia
 K = effective length factor of column (determined by the conditions of end support of the column)
 L = unsupported length of column

$$F = \frac{\pi^2 EI}{(KL)^2}$$

An ideal column (the pin) is one that is perfectly straight, homogeneous and free from initial stress. The maximum (or critical) load causes the pin to be in a state of unstable equilibrium, i.e. the introduction of the slightest lateral force will cause the pin to fail by buckling.

Using the formula the appropriate diameter, length and material for different pin loads can be determined and the set point accurately predicted every time. Pin dimensions are precise and the only variable will be the modulus of elasticity due to variations in ambient temperature. This is resolved by the use of materials which have minimal change in modulus of elasticity within the temperature range that the valve will operate in.

Pins are non-corrosive and will neither fatigue nor fail prematurely due to pulsation since this is prevented by the pin remaining in compression. Once buckled the valve is fully open in milliseconds.

Benefits of the new valve technology

The table below demonstrates some of the benefits of rupture pin technology over rupture discs.

RUPTURE PIN	RUPTURE DISC
Pins cannot fatigue and no annual replacement is required	Discs fatigue and can fail early. Annual replacement is recommended
Max. operating pressure to 98% of set point with zero leakage to set point	Many tolerances mean working close to set point is impossible
No vacuum support required. No reverse flow possible	Vacuum support may be required to prevent back pressure damage
Tolerance +/- 3% above 15psi and +/- 9% below 15psi	Pressures below 40psi have major accuracy penalties
Can sense upstream pressure only or differential pressure only	Senses differential pressure only – a problem for containment systems
Pins are rugged and can be stored with valve	Careful and costly storage of discs required
The valve is external to the system and the condition of the pin is visually apparent	It can be difficult or impossible to determine the state of the disc. Open line visual inspection is usually required.
The pin is not system or ambient temperature sensitive	If disc temperature is not monitored the set point is unknown
Pins are accurate, no vessel overdesign is required	Vessels often have to be overdesigned to compensate for disc inaccuracies
If required a Rupture Pin valve can be made to open to relieve pressure at a specific external fire temperature	In the case of a fire, without a pressure increase, the disc remains closed

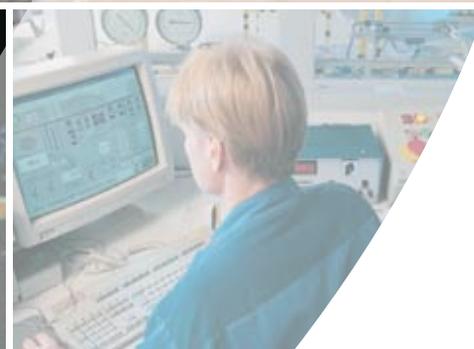
Rupture Pin valves along with the other new additions to the Econosto UK product range mark a new era of opportunity for the company. Managing Director, Clive Gamble commented, "The last year and a half has seen some rapid changes at Econosto UK, which even a couple of years ago we could not have foretold. We genuinely believe the changes will not only aid the company to adapt easily to changing market conditions but also will bring benefits to our customers in the increased choice in products and services."

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CPI - Light Weight Valves for Hypochlorite Service

Nil-Cor 410 Advanced Composite was specially formulated to provide a valve material that would provide maximum corrosion resistance when handling Sodium Hypochlorite and difficult to handle caustics. Although light weight, this glass fibre reinforced Polysulphone composite has the mechanical strength required for valves that are installed in the harshest of working environments.

No surprise then to find Nil-Cor 410 series composite ball valves in use on Sodium Hypochlorite injection lines on Brazil's Barracuda and Carratinga FPSO project, as well as Vietnam's Rong Doi platform.

Nil-Cor's Advanced Composites consist of a polymer matrix reinforced with glass, (or graphite fibres), compression moulded to produce a material which is resistant to corrosion and unaffected by exposure to ultraviolet light. Valve stems are Hastelloy "C" over moulded with composite, for maximum strength.

Nil-Cor 410 series valves are available in a flanged version dimensionally to ANSI/ASME B16.10, 1" to 4", class 150; and three piece, threaded NPT 1/2" to 2". The flanged version can also be supplied with a characterised ball for use as a control valve.



Light in weight but not in performance!

In addition Nil-Cor 310 series, glass fibre and vinyl ester, Composite Ball valves are in use on sea water services on the Tahiti and Mars production platforms in the Gulf of Mexico.

Nil-Cor valves are distributed throughout the UK and Ireland by CPI (Pneumatics) Ltd, of Sutton In Ashfield, Nottinghamshire, who can put together complete actuated valve packages, with a variety of actuators and positioners.



CPI (Pneumatics) Ltd

Tel: 01623 510245

Website: www.cpisystems.co.uk

Hardide coated ball valves pass ISO 10497 fire test

Hardide Coatings' ultra-hard tungsten carbide CVD coating has passed BS EN ISO 10497 fire-testing on several sizes of metal-seated ball valves designed and manufactured by Aberdeen-based EnerMech for corrosive and severe service applications.

EnerMech LG Valves' 2" Class 1500 flanged RF gear operated valve underwent the ISO test which confirmed the pressure containing capability of the valve under pressure during and after the fire test. The body material was ASTM A350 LF2. Certification was awarded by Lloyd's Register and covers the EnerMech LG Valves range up to 4" 300 Class.

Robin Gillham, business development manager for flow control at Hardide Coatings said: *"Adding this industry standard to Hardide's accreditations gives customers even greater confidence in our coating's performance on metal-seated ball valves. The Hardide coating has proven it will 'seal and survive', making it suitable for fire safe applications."*

Hardide Coatings provides LG Valves manufactured by Aberdeen-based EnerMech, with coating solutions that significantly extend the life of ball valves operating in severe service applications. These include sour hydrocarbon, sand, high pressure and produced



water applications in the oil and gas industry as well as power plant, chemical refinery, cryogenic, nuclear and food manufacturing applications.

EnerMech is an established international provider of mechanical services solution to the energy services sector.



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PPE - BioFuels Acidity Poses Storage Risk

The higher acidity of biofuels, compared with traditional oil-based fuels, will increase the risk of leaks in equipment used to store and handle the fuels, according to high performance seals manufacturer, Precision Polymer Engineering Ltd. (PPE), a Unit of IDEX Corp. The claim follows a year long research project involving immersion of elastomer sealing materials commonly used in fuel handling in bioethanol and biodiesel fuel blends which resulted in swelling of the seals.

Biofuels are commonly classified into two main categories: bioethanol and biodiesel. Both are used commercially as blends with conventional oil based gasoline and diesel, with ratios of 90% gasoline/10% bioethanol being most common. Diesel blends are conventionally 5% biodiesel blends with 95% conventional oil based diesel. However, ASTM (American Society for Testing and Materials) specifications are now in place for a range of blends up to 20% biodiesel.

High Biofuel Fuel Acidity - Valve Seals Swelling Risk

Results of 12 month immersion tests of a range of elastomer polymers typically used in fuel-handling equipment show that the seals are prone to significant swelling leading to seal failure in valves and other equipment. The swelling is caused by increasing acidity of the biodiesel due to oxidation. Moreover, the presence of water contamination of the biodiesel was found to accelerate the rate of elastomer swelling.

The chemical nature of the Biofuels blends is significantly different from that of oil based gasoline or diesel. Bioethanol is a polar solvent and not compatible with many of the elastomer grades that are used with non-polar gasoline. The higher the blend ratio of ethanol the more significant the effect will be, leading to excessive swelling and a deterioration of sealing properties over time.

With Biodiesel the chemical compatibility situation is more complicated. The originating chemical structure generated from the biomass is that of a methyl ester. Over time and the inevitable exposure to atmospheric oxygen, biodiesel undergoes oxidation to produce carboxylic acids and lowering the fuel's pH.

John Kerwin, head of materials technology, Precision Polymer Engineering, commented, "The research show that companies handling biofuels need to be aware of the increased acidity risk of biofuels on equipment seals, and either maintain their seals more regularly to check for signs of swelling or switch to



alternative sealing materials such as peroxide-cured, fluoroelastomers."

The 12 month ethanol and biodiesel immersion tests by PPE have shown that:

- Conventional NBR elastomers can be used within their normal operating parameters for both conventional gasoline and gasoline / ethanol blends. However they suffer from significant swelling with biodiesel.
- Bisphenol-cured FKM elastomers which are prone to a reversal of the rubber curing process, should be replaced with peroxide-cured FKM for biofuel and biodiesel applications.
- The rate of swelling varies depending on the immersion conditions, for example aged fatty acid methyl ester is more aggressive than fresh fatty acid methyl ester.

Bioethanol

Bioethanol is derived mainly from sugar cane and corn or maize. It is currently the most significant biofuel with production outstripping biodiesel by ten times. Biodiesel, on the other hand, is derived from a variety of sources. These include oils from rapeseed, sunflower, palm, and soya and animal fats mainly produced in Europe, which is also its major market.



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CPI - Composite Pneumatic Actuators Resist External Corrosion

In the past Epoxy Filled Composite Actuators have been used as an alternative to Epoxy Coated Aluminium Actuators in areas where external corrosion is a problem. CPI (Pneumatics) Ltd have teamed up with ITS to produce a new generation of Epoxy Composite Actuators.

Based on a single piston design previously used in industry, and off-shore, the new actuators incorporate several novel features.

Simple design with a small number of moving parts means reliability and a long working life, reducing expensive down time.

The actuators are of all Epoxy Glass Filled Composite Construction, with 316 stainless steel fixings. All components resist the effects of corrosion, both internal and external, making them ideal for



use in salt laden atmospheres, sea water, or where caustic wash-down is used.

Epoxy Composite piston, fitted with unique "U" seals inside a stainless steel piston sleeve, reduces internal resistance, increasing efficiency and therefore permitting greater useful torque. One piece stainless steel shaft and pinion reduces hysteresis. Single Acting version features all stainless steel, pre-stressed spring cartridges - reducing the risks of spring failure through corrosion.

Other features include ISO 5211 mounting pad, VDI/VDE top mounting & NAMUR solenoid valve mounting pad.

The range currently consists of three actuators sizes, namely, A50, A100 and A250. Other sizes are in the course of development, and will be introduced over the course of the next two years, until a range of six sizes are available.

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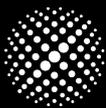
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Practical use of Detonation Flame Arresters

The use of detonation arresters as a means of explosion protection in industries handling flammable liquids, vapours and gases is widespread but is often widely misunderstood - a situation which can lead to potentially dangerous installations. It is often assumed that a detonation arrester gives universal protection, but such assumptions are unfounded. It is essential to understand the fundamental difference between the two types of detonation arresters available, known as stable or unstable types.

Proper design of explosion prevention and protection systems, coupled with rigorous operating and maintenance procedures should ensure that the possibilities of getting a flammable gas/vapour and air mixture in many process are remote, and the chances of it igniting are remoter still. But in storage



tank venting and vapour collection systems the risks are greater, so the proper use of flame and detonation arresters is paramount in ensuring the safety of a plant during its operational life.

What is a detonation?

In this context detonations are to be considered in open or closed piping systems, such as vent lines or vapour collection systems, when long lengths of piping are involved. When a gas/air mixture is ignited within the confines of a pipe the resultant increase in volume of the burning mixture causes the un-burned mixture

ahead of it to be pre-compressed and acceleration of the flame front occurs as the rate of combustion increases. The early stage of this process is termed a deflagration, where flame speed is sub-sonic and the pressure wave travels well ahead of the flame front; typically flame velocities are less than 100 metres/sec with pressures below 0.1 MPa g for explosions initiated under ambient conditions, but can be 200-300 metres/sec and 1 MPa g towards the transition to detonation. As the combustion process further accelerates eventually the flame front and pressure wave come together resulting in the formation of a high pressure shock wave in the so-called Deflagration to Detonation Transition (DDT) zone. This shock wave exists only marginally ahead of the flame front.

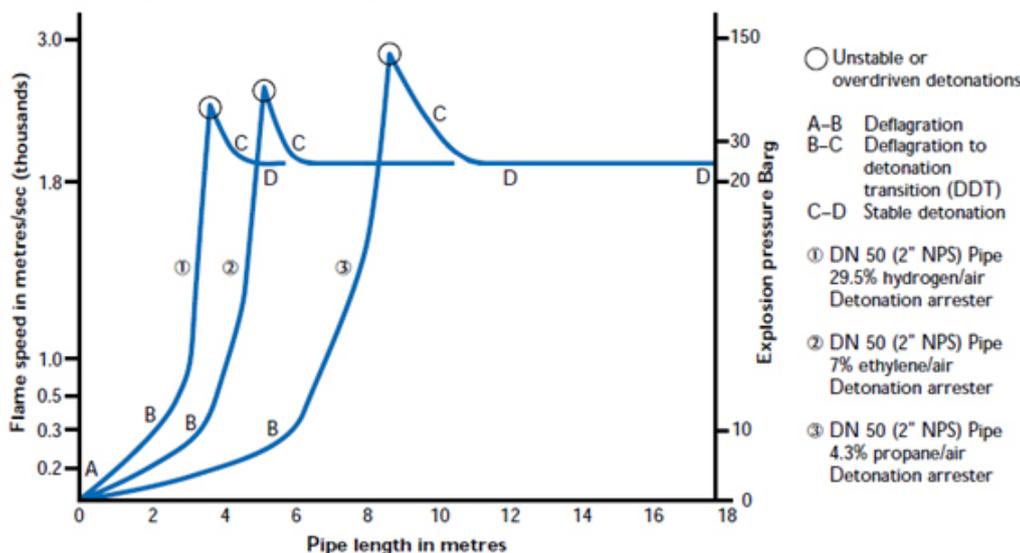
This zone is also characterised by an *overdriven* or *unstable detonation* where the severe shock wave compression can give transient pressures well in excess of 15 MPa g and flame velocities over 3000 metres/sec. The magnitude of these shock waves dissipate quickly and the detonation wave then becomes *stable*, with pressure around 2 to 3 MPa g and typical flame velocities between 1600 and 2000 metres/sec.

Detonations can only occur within certain gas/vapour concentrations; usually these are within the normal flammable range of the material in question. Towards lean or rich limits a phenomenon called a *galloping detonation* can occur. This can also occur when flame speeds are temporarily decayed to those in the deflagration zone by changes in direction (bends, elbows etc.) This basically means that a flame front can repeatedly fluctuate between deflagration and

stable detonation via the DDT/unstable detonation zone: an extremely dangerous occurrence.

It is important to emphasise that a stable detonation event can only occur after an unstable detonation has occurred. The point at which these events occur is heavily dependent on pipe diameter, piping configuration, pipe type (e.g.

Effect of Straight Pipe on Flame Speeds and Explosion Pressure



smooth welded, or rough with flanged joints), gas/vapour type, gas/vapour concentration in air, operating temperature and operating pressure. Only in controlled laboratory conditions with stoichiometric test gases can the position of these events be predicted with some certainty. In process plant it is far more likely that gases/vapours other than the standard test gases (propane, ethylene or hydrogen) will be handled, in concentrations towards the lean or rich limits of flammability and in pipe containing numerous bends, valves etc. These factors will affect how explosion protection, in particular detonation arresters, is applied.

How do detonation arresters work?

Cell type detonation arresters utilise the small cells together with an optimum cell length to provide a large surface area for heat transfer. Heat from burning gas is dissipated through the boundary layer within the cells and is eventually cooled to below its auto-ignition temperature. The size of cell required is dependent on the actual gas/vapour and may be defined using a fundamental property of all flammable gases/vapours - the Maximum Experimental Safe Gap (MESG).



Table 1: Typical MESG and Gas Groups according to ISO 16852:2008

Material	MESG	Gas Group (ISO16852:2008)
Acetic Acid	1.69 mm	IIA1
Methane	1.14 mm	IIA1
Acetone	1.04 mm	IIA
Hexane	0.93 mm	IIA
Ethanol	0.89 mm	IIB1
Tetrahydrofuran	0.87 mm	IIB1
Di-methyl Ether	0.84 mm	IIB2
Ethylene	0.65 mm	IIB3
Ethylene Oxide	0.59 mm	IIB
Hydrogen	0.29 mm	IIC

Stable Detonation Arresters

The use of stable detonation arresters, whilst common practice in Germany and recognized by ISO16852:2008, is fundamentally flawed because it totally ignores the presence of DDT/unstable detonations and galloping detonations, seemingly relying only on accepted levels of risk. Moreover, manufacturers of such devices do not necessarily make the risks involved in using these 'detonation' arresters obvious to the user.

As an analogy consider a fundamental explosion prevention technique of maintaining the gas/air concentration at 25% of the lower explosion limit (LEL). It could be considered equally acceptable to maintain at, say, 25% above the upper explosion limit (UEL), but because the full flammable range has potentially to be passed through to reach this, it would not normally be considered good practice. So why use stable detonation protection when an unstable state has to be passed through first; this level of risk is *totally unacceptable*.

ISO16852:2008 (paragraphs 7.4.4, 11.1h and Annex D) tries to overcome this by not allowing the use of stable detonation arresters in isolation, and associated levels of protection in Zone 0, Zone 1 and Zone 2 areas (typified by the German TRbF 20 regulations). The fact is if a detonation can occur it will take no notice of whether it is in Zone 0, 1 or 2, the end result is the same.

Stable detonation arresters are built to lower standards than the unstable types and when subjected to the DDT/unstable zone will be often be mechanically destroyed because of the extremely high dynamic loads exerted with unstable detonations for which they are not designed (See 'How Safe is the Process Piping' later in this article).



Unstable Detonation Arresters

For most of the world only unstable detonation arresters are considered acceptable, e.g. the 'United States Coast Guard Standard', when testing for both stable and unstable detonations, only permits the use of arresters that have been certified for both. Because of the unpredictability of detonation events in practice no other device can give the universal protection without the need to consider possible location and use of additional protective systems. One criticism of unstable detonation testing is the inherent unpredictability and wide range of flame speeds and pressure which may be measured compared to stable detonation testing (where these parameters can be calculated from theoretical principles). However, considering the number of tests carried out, this surely gives a more robust solution than risking a much lower performance stable detonation arrester. After

all it would never be acceptable to use a deflagration arrester instead of a detonation arrester because the chances of it seeing a detonation are very small.

Unstable detonation arresters may have higher pressure drops compared to their stable counterparts, however, considering that stable types may have to be used in duplicate or with a deflagration arrester this issue is in reality of no concern. Such factors as flow capacity and pressure drops need, in any case, to be considered during the design stage of a process, although in reality are often considered only as an afterthought, thereby causing unnecessary practical and cost problems.

Detonation Arresters subjected only to Deflagration Events

The fact that a detonation arrester is used does not necessarily mean that it will always be subjected to a detonation. Considering the effects of, for example, lean/rich vapour/air mixtures, only a deflagration may result from an ignition of the mixture. Unless rigorously tested there is the possibility that a detonation arrester can fail when subjected to a deflagration flame front. Both the USCG and ISO16852:2008 test protocols allow for testing of detonation arresters with restricted outlets. With USCG this is mandatory, whereas in ISO16852:2008 it is optional, leading to an unnecessarily large number of detonation arrester types. A restricted outlet refers to, for example, a partially closed valve or elbow immediately on the protected side of the detonation arrester. In a deflagration, the pressure wave is ahead of the flame front; such a restriction may cause a back pressure before the flame front has actually reached the detonation arrester, causing the gas then to burn at a higher pressure to that for which it may have been certified and the flame will pass through the detonation arrester.

Relocating the valve or elbow etc. further from the detonation arrester will eliminate this potential problem, but far better is to certify the detonation arrester to allow for restricted outlets.

Effect of Elevated Temperatures and Pressures

Detonation arresters are often used in applications where the process is operating at temperatures and pressures higher than ambient/atmospheric; these are typically up to 60°C and 0.01 MPa g. In such cases it has to be determined what the conditions are under which a gas or vapour/air mixture can ignite in a given process. For example, unless air at the same pressure is available in a high pressure gas relieving vent, the only time when the detonation arrester has to function is when air and gas can mix, probably at atmospheric pressure, when the relieving gas pressure has decayed allowing back mixing with air. At elevated pressures more energy is developed and flame acceleration is more rapid, so explosion pressures are higher (roughly

in direct proportion to the initial pressure at ignition) and the DDT zone will be reached in a shorter pipe length.

In any case if gas/air can be present at elevated pressure and/or elevated temperature it is essential that any detonation (or in-line deflagration) arrester has been tested and certified for use under these conditions. ISO16852:2008 has apparently arbitrary limits of 150°C and 0.06 MPa g, but arresters are certainly available for higher temperatures and pressures. Considering that such arresters may have higher pressure drops and be more expensive it is vital that the process is evaluated carefully to avoid unnecessary problems.

Stabilised Burning

Stabilised burning is a phenomenon that can occur when a flame arrester is passing flammable mixtures of gas/vapour and air which can ignite and, because of the flow rate, continue to burn on the surface of the flame arrester element. It is more likely to occur during uncontrollable venting of atmospheric storage tanks and flame arresters used in such applications often need to be endurance burn proof, which means that they can withstand premixed burning for an indefinite period. According to regulations such as TRbF 20, using detonation arresters with a suitably long vent pipe can ensure that burning cannot occur on the arrester element. The validity of this is suspect since it assumes the detonation arrester will always be subject to a detonation, whereas in practice a deflagration is just as likely to occur.

Of course, stabilised burning can also be possible with in-line applications, such as vapour recover installations, and the detonation arresters used must be capable of handling such events. Whilst endurance burn proof detonation arresters are available, their use in isolation (as with all endurance burn proof flame arresters) has to be questioned since it effectively allows an undetected fire to burn in a hazardous area without any action; during testing the unprotected side of the arrester housing may be glowing red, making nonsense of the hazardous area temperature classifications! Far better and safer is to fit temperature monitoring equipment so that appropriate action to stop the burning can be taken in the shortest possible time. Fitting temperature sensors is, in any case, essential if the detonation arrester can only withstand burning for a limited period and such an event is possible in the process concerned. ISO16852:2008 requires the stabilised burning time to be clearly labelled on the flame or detonation arrester.

How Safe is the Process Piping?

A frequently asked question concerns the suitability of normal process piping if detonations can occur within them. In simple terms a flame front/detonation travelling down a pipe is not to be considered a static

pressure (although piping should be able to withstand the normal static explosion pressure, so 1 MPa g rating at ambient conditions, for example), but a dynamic shock pressure which only acts on the pipe walls for milliseconds. By far the greater danger is the momentum and energy effect of the flame front/detonation when its progress is interrupted by, for example, pipe bends, valves and flame/detonation arresters. When this momentum/energy is transferred it can result in a catastrophic failure unless this equipment is designed to withstand such forces. For this reason deflagration and stable detonation arresters will fail mechanically (as well as pass flame) if subjected to DDT/unstable detonation forces. The location of such fittings/valves must be considered carefully, adequate support provided and unstable detonation arresters placed strategically to minimize the risk of mechanical failure in the piping.

Summary

It is dangerous to assume that a detonation arrester, without qualification as stable or unstable type, can provide full protection in the event of an ignition of flammable gases/vapours in piping systems.

Using stable detonation arresters in isolation potentially puts lives and multi-million dollar process plant at risk because stable detonation arresters:

- Only protect against deflagration and stable detonations;
- Have fundamentally flawed limitations on location;
- Do not protect against galloping detonations;
- Must be used together with other protective systems.

Only unstable detonation arresters can provide full protection against deflagrations, stable, unstable and galloping detonations without limitations on location.

Referenced and Other Relevant Standards

ISO16852:2008	Flame arresters - Performance requirements, test methods and limits for use.
TRbF 20	Technische Regeln für brennbare Flüssigkeiten (Regulations for the handling of flammable liquids).
USCG	United States Coast Guard CFR 33 Part 154 Appendix A.
EN 1127-1: 2008	Explosive Atmospheres – Explosion Prevention and Protection Part 1: Basic Concepts and Methodology.



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Emerson Actuator Works Faultlessly After 20 Years

Emerson Actuator Works Faultlessly After 20 Years in Arduous Offshore DUTY - Installed on riser ESD valve, the actuator was the most powerful of its type at time of installation.

BETTIS® Since 1989, offshore installations in the English sector of the North Sea have been required by law to install Emergency Shutdown (ESD) valves to isolate the installations from oil and gas pipelines. A Bettis™ valve actuator – specially designed by Emerson Process Management – installed at that time has just been decommissioned after 20 years of faultless service. Used in extremely arduous duty, the actuator is being decommissioned because the valve has been re-sized due to the reduced flow rates of the field.

Installed in a riser emergency shutdown system, the Bettis TRQ actuator was designed specifically for the application. With a torque rating of 67,800 Nm (600,000 in-lb), the spring return actuator was the most powerful of its type at that time. Its unique quad design required four cylinders and two spring units to overcome the enormous valve stem forces of the 20in Class 900 valve and to meet the stringent client safety factor requirements. Two of the cylinders have 50cm (20in) pistons and two have 40cm (16in). The actuator weighs over 5.08 tonnes (5.6 tons) and is over six metres (20 feet) in length.

The regulations introduced in 1989 also covered inspection and testing of ESD valves, including the requirement to perform a partial stroke test of the valve at intervals not exceeding 6 months. The installed Bettis TRQ actuator was one of the first with this diagnostic capability. Partial stroke diagnostic tests have been able to prove satisfactory operation over this actuator's lifetime, avoiding the need to remove the actuator from the line for maintenance.

Emerson has developed its actuator technology significantly over the two decades since this actuator was installed. The company has supplied actuators providing over 226,000 Nm (2,000,000 in-lb) of spring end torque, and has the capability to supply a unit providing 565,000 Nm (5,000,000 in-lb) torque output.



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Testing times at KKI



KKI's testing bays

Valve testing has come a long way since Koso Kent Introl built its first bespoke test facility in the yard of its Factory 2 site in Brighouse, back in the 1980s.

The 'giraffe house', a tall, wooden structure was originally built to enable a single gas test to be carried out, but was then used more or less continuously for the next two decades. More recently, KKI has made significant investment into state-of-the-art testing facilities on-site – creating a testing suite inside its Factory 2 site in Brighouse, which has been totally re-configured to accommodate it.

Creating a complete testing capability

Today, four fully-equipped test bays are used to carry out the full range of valve tests, including body hydrostatic testing, body gas testing and PR2 qualification testing (to API6A/ISO-10423/ISO-13628-4) and fugitive emission testing (to ISO15848-1).

Since every valve undergoes at least a hydrostatic test before it leaves the factory, significant investment has been made into the company's facilities for these tests, which can subject a valve to up to 1.5 times its maximum specified working pressure. In particular, the water treatment system not only ensures the water is kept clean and at a uniform pH level, but also uses corrosion inhibitors and biocides to protect the valves, ensuring they do not rust as they are subjected to tests.

And later this year, to complete the facilities, behind 4" thick timber doors lined with 10mm of steel, reinforced concrete walls, and a state-of-the-art access system, KKI will proudly unveil its brand new high-pressure gas testing pit. Sunk to a depth of 2.5 metres, containing 6000 litres of treated water, the pit will allow even the largest of valves to be tested, in the safest possible environment. The facility – one of perhaps only four of its kind in the UK – will allow gas testing with helium or nitrogen, to 1.1 times a valve's maximum specified working pressure.

In the last 18 months, KKI has also invested in a new test hydraulic power unit (THPU) with automated programmable logic control (PLC) for the qualification and factory testing of subsea hydraulic actuators. It has since been used for the performance and million-step testing of the current KKI subsea actuator range, which was successfully concluded recently. The unit runs 24 x 7 and is capable of testing up to 5,000 psi working pressure systems and either stepping or modulating functionality.

Benefits

This massive overall investment in testing facilities is a result of Koso Kent Introl's continuous improvement philosophy. The outcome is much more efficient and cost effective production processes, since valves no longer need to be sent externally for testing. In this way, workloads and project timelines can be much more accurately managed, especially if any functional anomalies are found in the valves during testing,



Data is analysed on-site, in real time since remedial action can be taken immediately.

Data is collected and recorded digitally, allowing a complete audit trail of all testing activities to support valve certification at the end of testing. Where appropriate, customers are invited to inspect testing procedures as they are taking place; on occasion they even specify the parameters of the tests themselves. This gives greater levels of reassurance, especially where valves will be operating in severe service applications.

And of course, since the health and safety of the workforce is of paramount importance to KKI, these facilities mean that the risks associated with testing under pressures of up to 22,500 psi and at temperatures ranging from -196 to +250 degrees C are fully controlled.

The future

The giraffe house stands empty in the yard these days, a soon-to-be-demolished reminder of the long history of testing at KKI. But the future of this vital process is brighter (and is certainly much warmer!) as a result of the new facilities that have been created at KKI recently. Moreover, the company's knowledge and expertise will be more readily available to the industry going forward, as KKI plans offer its testing facilities as a service to customers in the near future.

Shaping subsea testing practices for over a decade

It has long been accepted that subsea valves (or more particularly their actuators) must undergo a million-step endurance test to prove reliability of design over time. KKI was involved in the initial specification of this test, back in the late 1990s. An industry-sponsored study was set up to review the proposed designs of subsea control, choke and high performance butterfly valves (including actuation) for one of the first subsea separator systems in the industry.

As part of the study, extensive site integration testing (SIT) including the subsea valves, control system and umbilical would be carried out at KKI's Brighthouse facility.

Deciding that the actuators would carry out approximately 600,000 actions in their working lifetime, KKI proposed that a million steps should actually be tested. Since then, this number has been accepted as the standard testing requirement for this equipment.

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Isolation Safety Control Steam Trapping



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K Controls - Sub-Sea Valve Actuator Position Monitors

K Controls manufactures an extensive range of sub-sea valve actuator position monitors for on/off or modulating applications. The maximum depth of submersion for different versions is between 25 and 2500 metres and the enclosure material can be either epoxy coated carbon steel, 316 stainless steel or duplex stainless steel.

Applications where the products are used include rig positioning, sub-sea emergency shut down or manifold valves, dry docks and tanker loading or balancing.

A variety of hermetically sealed solid state or reed style proximity switches can be fitted together with 4-20mA, HART®, PROFIBUS® or FOUNDATION™ fieldbus position transmitters. The options of non-contact sensing and component redundancy are available.

ATEX 11 2 G Ex ia certification is also available should the unit be required for intermittent submersion in a hazardous area. A standard M20 or 1/2" NPT conduit entry is provided. Alternatively the base can be machined to accept a customer specified sub-sea connector.



More than 300 IP68 (sub-sea) K4-20 Position transmitters have now been specified for use at a depth of 135 metres in the Caspian Sea. They are used to monitor the position of hydraulically actuated valves that flood the jackets on the legs of oil rigs. The legs of the rigs are positioned and then submerged using global positioning satellite technology.



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For more information:-

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Selecting Elastomers For High Pressure, Rapid Gas Decompression (RGD) Applications

In applications where RGD is a possibility, valve OEMs and end-users require parts moulded from elastomers designed and proven to be resistant to this mode of failure.

As a general guide, RGD can occur from pressures of 5MPa (50bar) where the pressure drop is greater than 1MPa / hour (10bar/hour). This can lead to surface blisters, splits or catastrophic failure in elastomeric seals and components. Originally referred to as explosive decompression, the current term used to describe such pressure drops, and this mechanism of seal damage is Rapid Gas Decompression (RGD).

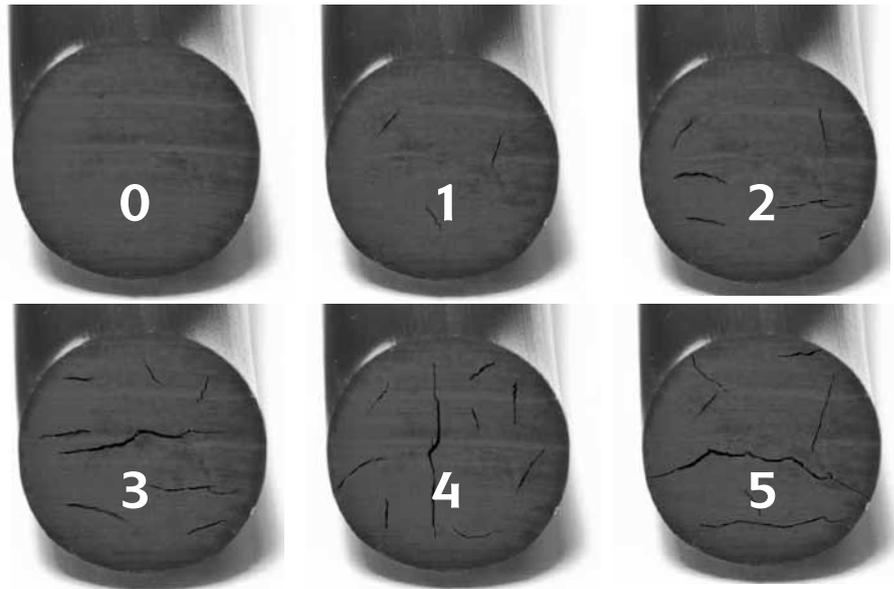
RGD resistant

Although no elastomer is RGD proof; elastomers can be formulated, compounded and processed to be highly RGD resistant and several well known test methods exist for evaluating RGD resistance in elastomeric seals including the most widely quoted standard; Norsok M710 Annex B.

Those looking to purchase elastomeric seals and components for use under RGD conditions will have seen many brochure claims such as "Approved to... passed to equivalent of... or qualified to", but what do these claims actually mean in terms of operational performance?

Norsok performance benchmark

In assessing the performance of its own elastomer compounds for RGD performance, sealing material and systems manufacturer James Walker uses the Norsok M-710 qualification criteria. Using its own highly developed RGD testing apparatus at the company's UK Technology Centre, the standard test regime is 100°C (212°F) using a pressure of 150bar (15MPa) and a decompression rate of 35bar/minute (3.5MPa/minute). This decompression rate is actually well in excess of the 20bar/minute industry standard required under Norsok M-710.



These samples indicate the levels of damage sustained as described under the Norsok M-710 rating system

Norsok rating system

Following the decompression procedure each test seal is cut into four equal radial sections and the resulting cross sections examined for internal cracks with a microscope using at least 10x magnification. Observations are then rated from 0 to 5. Zero denotes no damage, 1 to 3 increasing damage sustained, 4 and 5 denoting too much damage sustained to pass the test.

The "overall rating" for a set of three replicate seals is defined on a worst case basis as the highest rating for each cross section over the three replicates. Thus, if the rating for three seals were 1110, 3110, 2220, the overall rating would be 3220 and the seal would pass the test.

A perfect '0000' rating demonstrates that there was no evidence of any damage on any sample following the RGD test.

It is still possible however to claim a pass on the Norsok M-710 rapid gas decompression test even at a rating such as '3333'.

Compromised safety and performance

The potential difference between a 3 rating pass and a 4 rating fail can be incredibly small, as is evident from the example 'O' ring sections shown here. Under true operational conditions, damage of this level will impair seal performance and offers virtually no safety margin.

It must be remembered that these levels of damage are being created under carefully controlled test conditions. Under operational conditions, media composition and fluctuations in temperature can further compromise RGD performance and significantly increase the possibility of seal failure.

Bearing this in mind, even a material with a Norsok rating of 1 or 2 is sustaining damage during the test which under operational conditions would compromise performance, reduce safety margins and could lead to failure over time.

Further considerations

The Norsok standard requirement is to test O-rings of 5.33mm cross section. Many end-users incorrectly assume that this means the elastomer concerned is suitable for RGD use full stop. This is sadly not the case at all. An elastomer that passes at 5.33mm section will not necessarily pass at larger sections. Tests have frequently shown elastomers passing with zero ratings at 5.33mm and failing catastrophically at 6.99mm.

Temperature is another critical factor. A material may pass with '0000' ratings at larger sections than the standard 5.33mm, but raise the temperature of testing and the same material may fail catastrophically even at the smallest section.

When selecting an elastomeric material for use under RGD conditions, simply checking literature for a 'Norsok pass' is not always sufficient. The following points should be carefully considered;

- What were the actual test conditions and decompression rate?
- How does the test temperature compare with your application?
- What seal section was tested, and what section do you require for your application?
- Check the ratings obtained. Even a '1' rating indicates damage was sustained – is this acceptable for the application concerned?



James Walker's FR68/90 fluoroelastomer showing a '0000' rating at 8.4mm section following testing to Norsok M-710 Annex B

Maximising operational safety

In order to maximise operational safety in terms of RGD resistance, James Walker utilises the '0000' rating (zero damage) as the benchmark for its own materials as this is the only rating at which the material has suffered no visible damage under test.

Whilst a 'pass' of any level on the Norsok test obviously provides a level of confidence to purchasers and specifiers – a '0000' rating representing the ultimate assurance – James Walker is currently seeking to extend the RGD test regime in cooperation with a number of major oil and gas customers.

More demanding than current tests, the new regime is aimed at simulating more accurately the true operational conditions. This involves higher system pressures, faster decompression rates, higher temperatures and an increased number of decompression cycles. The examination process and damage rating system will remain the same as for Norsok, but the results will provide a more accurate picture of likely performance under operational conditions.

Whilst tougher testing regimes will inevitably result in a shorter list of suitable materials, it will provide greater confidence in operational performance for both the seal and associated equipment, essential as the oil and gas industry moves into increasingly hostile operating environments.

James Walker

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Addressing Explosion Protection for Offshore Actuation



An impressive portfolio of offshore applications includes installations for Shell

With electric valve operation playing a key role in oilfield applications, AUMA has observed that the ability to perform in hazardous areas is essential to product design. In this report for Valve User, AUMA details explosion protection features for actuation technology, the importance of modularity and the essential role of standards.

First, a definition of what is meant by an explosion is provided and the importance of protection as an integral design feature of actuators is addressed:

As a precondition to trigger an explosion, a mix of flammable substances and oxygen is required. With a suitable ignition source, a chemical reaction results and, if the reaction velocity exceeds the sonic speed, this is defined as an explosion. The destructive effect of an explosion is the result of the sudden expansion of the build-up of flammable mixture in the form of a blast wave. An explosion hazard can safely be

prevented if one of the three components (fuel, oxygen and an ignition source) is successfully eliminated.

Explosion proof equipment

Electrical equipment, including actuators, are a potential source of ignition as hot surfaces occur during operation and electric voltages/currents can cause ignition sparks. Explosion-proof electrical equipment, including actuators, must therefore be designed to prevent the occurrence of high temperatures at the surface and to ensure that there are no ignition sparks during operation.

Addressing this requirement, AUMA has developed a range of actuators for use in hazardous areas. Used in a wide range of applications including refineries, tank farms, extraction plants and pipelines around the globe, these actuators offer a robust and reliable solution for potentially explosive atmospheres.

The flameproof enclosure protection allows for an explosion inside the electrical equipment. Flameproof joints, or housing parts, are designed in such a way that burning particles or a flame cannot reach the outside



AUMA's Generation .2 actuator range includes explosion proof products

elements: this is achieved by accurate sizing of the gaps and widths of the flameproof joints. Completing the explosion proof solution, a rigid housing ensures that the actuator can withstand, without damage, the pressure that develops during an internal explosion.

Certain oil industry applications require actuators to close the valve within a defined time span in the event of fire. Meeting this need, AUMA electric multi-turn actuators in fireproof versions are available with a specially designed coating that ensures full functionality for at least 30 minutes if exposed to temperatures up to 1,100°C.



Plug-and-play modular AUMA technology benefits the offshore industry

Adaptable actuation

Modularity plays a key role in the effectiveness of an explosion proof actuation solution. A mix and match system, with components dove-tailing, together ensures that the actuation products can be expanded, enhanced and refined on-site without removing the system for a factory upgrade. Housing electrical connections separately from the actuator using 'plug-and-play' technology is an important feature as wiring can be reached without disturbing the actuator's internal components. And, from a safety perspective, should the actuator need to be removed, this can be done without contacting any cables.

Non-intrusive setting is another important feature of explosion protection actuation solutions – this is particularly important in hazardous areas, as the

actuator housing does not need to be opened to change settings.

And, with regard to remote access to protect on-site operators, fieldbus technology has contributed significantly: using field device technology/device type manager (FDT/DTM), actuator parameters means actuators can be set remotely via the bus solution, which is of particular benefit in a hazardous environment.

Industry standards

Standards, as described in the European Standards EN 50014 etc. for electrical equipment and EN 13463-1 etc. for non-electrical equipment, have a key role to play in the development of actuation solutions and the selection of products.

Directives are also important: the ATEX Directive 94/9/EC for example governs European equipment supplied to potentially explosive atmospheres. It defines the general protection objectives: protection of persons and property. Precise knowledge of the conditions under which the devices are to be operated is important for the selection of the electrical equipment. The description is designated by one of the three following terms:

- Zone/equipment category
- Explosion group
- Temperature class

Potentially explosive areas are divided into zones according to the presence of possible explosive atmospheres. Gases are classified into explosion groups and temperature classes according to their hazardous level – the temperature class defines the permissible maximum surface temperature of the equipment and the explosion group divides the gases according to minimum ignition current and maximum experimental safety gaps.

Concluding this report, AUMA observes that the challenges of supporting oil depots and the requirements of supplying demanding offshore locations need to be clearly understood and addressed by any supplier of field devices. Issues of safety need careful attention, standards need to be monitored and solutions are required that enable upgrades with minimum disruption.

Note: AUMA has supplied electric actuators to the oil and gas industries for over thirty years. The company's products are widely adopted internationally providing valve control for automation of refineries, tank farms, extraction plants and pipelines.



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Valve World Americas 2011

A Review by Christian Borrmann, Valve World magazine

After years of requests from both valve companies and end-users, on 21 & 22 June 2011 the premiere staging of Valve World Conference & Expo Americas took place in Houston, Texas. The largest portion of the visitors came from North and South America but lots of interested people from Europe and Asia also attended.

Day 1

On Tuesday morning, after the delegates' Powerbreakfast (sponsored by Bray Controls) the conference kicked off. After short introduction by myself, Valve World Editor-in-Chief Christian Borrmann, Conference Chairman Mr Jerry D'Avanzo from DuPont Engineering took over the microphone and opened the Conference by officially welcoming all the delegates and sponsors. He also thanked the Steering Committee and all the moderators and panel speakers for their efforts and hard work that they had put into the organization of the workshops.



Mr Kees Meliefste from Dow (right) in discussion with a representative from GE Energy about their waterproof valve systems.

He explained that the Committee had taken the chance of having a new event and had tried a different approach to previous Valve World expos. Instead of having a call for papers and then sessions, where these would be presented, the committee decided to run a conference compiled of six plenary presentations and only eight workshops in order to increase the participation of the audience and invite the delegates to actively discuss matters. After this short explanation, Mr D'Avanzo continued with a presentation on the 'Importance of Process Safety Maintenance' on how important it is to maintain equipment.

Following this came one of the most requested presentations. Mr João Henrique Rittershausen from Petrobras in Brazil spoke about the company's business plan for 2014 and beyond. The morning session was then rounded off by Mrs Marie Murphy, Cooper



The Partial Stroking Workshop. This was moderated by Henk Hinssen from iHandl Engineering and generated a lot of interest and follow up discussions as well as a blog.

Nuclear Power Station NPPD, who spoke about the importance of exchange of information amongst peers in order to build up expertise and efficiency. She used her experiences of being a long-standing member of various nuclear valve industry groups to illustrate how they work together and exchange information about problems, solutions and issues with valve companies, etc.

After a short break, where the delegates descended into the expo hall for coffee and meetings with valve companies, the delegates broke down into three groups to attend the first round of workshops. The topics of these were 'Predicting Valve Performance during the Sizing and Selection Phase', 'Standards & Organisations' and 'Unconventional Energy Sources'. All three workshops attracted big audiences and some rooms were so full at times that people had to stand alongside the walls in order to participate.



Speakers Corner took place on Tuesday afternoon on the expo floor. Rich Davis spoke about Fugitive Emissions and the two main standards, API and ISO, which generated a lot of interest.

Day 2

On the second and final day of the event, the delegates had a full conference day, which left them time to walk the expo floor during the coffee breaks, lunch and the evening cocktail hour. There was also an increase in the number of delegates attending the second day.

After breakfast, the conference continued with another set of three plenary presentations. After a coffee break, the second round of workshops took place and the topics covered were 'Counterfeit Valves – A Threat to the Valve Industry', 'Fitness for Service' and 'The Good, the Bad & the Ugly of Partial Stroking'. Again, all three workshops were an enormous success according to attendees and organizers. And after the lunch the final round of workshops took place: 'Supply Chain Management' and 'Cryogenic Testing'.



The delegate lunch area was a welcome spot for networking and post-workshop debate.

With the conference concluding, the number of expo visitors increased again. Talking to exhibitors, delegates and visitors, the reactions were very positive: "One of the best Valve World events ever" – "The workshop on counterfeit valves was a real eye-opener and I hope that we can keep this discussion going" – "The expo contained a good mixture of valve companies with a strong focus on the Americas".



Mr Danilo de Tomi and Mr Andrea Lana from DeTomi, Italy

Valve World Americas returns in 2013

The Valve World Conference & Expo Americas comes back in 2013 and it will take place in the George R. Brown Convention Center, Houston, Texas on 25 & 26 June 2013.

For further information please contact Christian Borrmann:
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Turn it on!



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Tyco Flow Control Develops Custom-Designed Bled Steam Check Valves

Tyco Flow Control has developed an advanced Fasani bled steam check valve specifically for supercritical coal-fired power stations. The valve was custom-engineered for a major turbine manufacturer, in a contract for several power stations in different locations around the globe. The check valve portion of the contract is worth €2.5 million, with future projects in the pipeline.

The valve was designed to meet two key requirements; it must close up to ten times faster than current valves and close 100 times without deformation. Tyco's Fasani engineers met these stipulations through modifications to the hinge design, without changing the body, actuation system or seat. The typical closing time of the new Fasani bled steam check valves is 0.1 seconds, compared with 0.6 – 1 second in previous check valve designs.

As technology advances, supercritical power plants are becoming more common, with higher levels of temperature, pressure and flow velocity calling for valves that can handle the challenge. Plants with an output of 800 MW or higher now occupy a much smaller space than would have been required a decade ago. These space limitations and improved efficiencies demand re-designs and a more complex layout, such as around the boiler. With all elements closer together in a smaller space, there is a greater risk of damage in the event of failure. The Fasani bled steam check valve is designed to be situated closer to the turbine, and to handle a harsher operating environment. Its proximity to the turbine demands an increased closing speed to protect the turbine blades from damage from reverse steam flow.

In designing the bespoke valve, Tyco Flow Control worked in cooperation with Politecnico di Milano to conduct materials testing. As part of an ongoing collaboration, Tyco and the university used CAD to re-create the operating environment, since testing in the actual physical environment would not be possible. Using COMSOL finite element analysis software, it was found that carbon steel, the traditional check valve hinge and disk material, would not endure the increased temperatures of a supercritical plant. As a result, C12A was selected for the hinge and disk due to its strength under pressure and temperature stresses.

QA procedures have led to the certification of two foundries within the Tyco global supply chain that meet high standards in quality and service. These foundries will produce the material for the valve body, disc and hinge. The contract also includes certification of Fasani to conduct much of the valve testing directly. Fasani will conduct critical and non-critical tests on each



Fasani Bled Steam Check Valve

new valve to ensure quality and reliability, including ultrasonic, radiographic and impact resilience testing.

Bruno Manzetti, director of engineering, Fasani, commented: *"With further advances in technology, we expect to see more and more supercritical power stations that occupy less space. This means that valves that can handle more challenging environments will be in greater demand."* He added: *"Our engineers are available to discuss custom valve solutions for harsher environments. The new Fasani bled steam check valve is an example of our commitment to excellent service, and to working with our customers to meet their requirements."*

The valve was in design and development for more than a year and is available for situations where resilience to the environment and speed in closing are essential. Collaboration with the Politecnico di Milano formed a key stage in this design process. This partnership was part of an ongoing contract with the university that allows students to learn about industry issues and gain real-life experience, while Tyco Flow Control can access the university's cutting-edge resources and knowledge.

With other projects to follow in Europe and further advances in plant technology, highly sophisticated valves such as the new Fasani valve are expected to be more in demand. Tyco Flow Control draws on a wealth of experience from many years in the power industry and a trusted portfolio of leading brands. In coal, gas, nuclear, solar, geothermal applications, Tyco engineers can provide service and product solutions to meet any requirements.

tyco / Flow Control / **Tyco Valves & Controls**

Tyco Valves & Controls

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Pressure Tech in clov-er in S.Korea

Rapidly expanding UK regulator manufacturer Pressure Tech has secured a further large order from the lucrative South Korean market. A major supplier of actuator control systems for FPSOs - floating production, storage and offloading vessels - has ordered a massive 100 units of the economical LF-540 hydraulic regulator to be used in the important Clov field.

FPSOs are preferred in frontier offshore regions as they are easy to install, and do not require a local pipeline infrastructure to export oil. The regulators will be used to help control the ballast systems of the vessels, which actually use oil to provide stability. Pressure Tech's LF-540 was chosen for its combination of outstanding economy and excellent sensitivity.



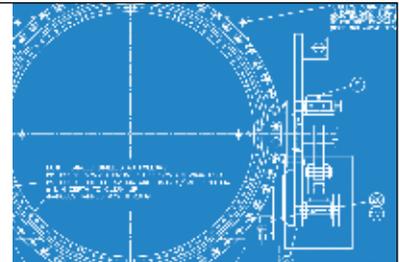
Regulator installation

Altogether, this is the fourth project that the innovative Glossop-based manufacturer has secured in South Korea in recent years. Steve Yorke-Robinson, Pressure Tech's Managing Director, commented, "When economy and performance are key criteria for a client sourcing pressure regulators, it's our objective to be the first name on the shortlist. I'm delighted to receive such a large order, and from such an important market to boot."

PRESSURE TECH

Pressure Tech
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Website: www.pressure-tech.com

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Hobbs Fire Safe Nickel Aluminium Bronze Valves

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Non Graphite and Nickel Aluminium Bronze Hobbs valves are now fire safe certified to BS EN ISO 10497: 2010

The overall purpose of this standard is to ensure the valve is able to perform during a fire, providing an ability of the plant or process to be controlled preventing possible catastrophic events to unfold.

Due to our innovative design and high quality of materials used, Hobbs time and time again pass the Lloyds fire test with flying colours. Copies of our Lloyds Inspection Certificate are available upon request.

Please feel free to contact our sales team to discuss our new Fire Safe Nickel Aluminium Bronze Triple Off-Set Butterfly Valves.

Hobbs Valve continually strives to be at the forefront of Triple Off-Set Technology and always provide our customers with 'Tomorrows Valve Today'.



Hobbs Valve Ltd

Tel: 029 2086 1099

Website: www.hobbsvalve.co.uk

Crane Take Part in Valve Basics Seminar & Exhibition

Crane ChemPharma and Crane Energy Flow Solutions Take Part in Valve Basics Seminar & Exhibition



Crane ChemPharma Flow Solutions™ and Crane Energy Flow Solutions®, leading providers of highly engineered products for fluid handling applications worldwide, are pleased to announce their participation in the Valve Basics Seminar & Exhibition hosted by the

Valve Manufacturer's Association of America (VMA); June 6-7 in Calgary, Alberta, Canada. Having recently secured Canadian Registration Numbers (CRN) for its Krombach® Metal Seated Ball Valve (MSBV), CRANE will showcase the product in Canada for the first time.

"The Valve Basics Seminar represents a great opportunity for us to take part in the education of the industry, something that CRANE continually offers through white paper presentations, published technical articles and presentations of our TP410 which will also be on display at our booth," said Robert Marocco of Crane ChemPharma Flow Solutions. *"Additionally, this conference is the first Canadian event in which Crane will participate since obtaining the CRN for our Krombach MSBV. We are truly looking forward to educating the industry on the features and benefits this product offers now that it is available to this market."*

Crane ChemPharma Flow Solutions' Krombach MSBV was designed for specialty chemical and mining applications. Features of the Krombach MSBV include an innovative interchangeable ball and seat, polygon stem-to-ball connection, and self-cleaning system. Crane will also highlight its applications expertise within both its ChemPharma Flow Solutions and Energy Flow Solutions businesses.

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Emerson's New Pinch Valve

New pinch valve from Emerson now allows automated control of low volume, clean and sterile liquids

Emerson Process Management introduces its Baumann™ 85000 sanitary pinch valve for low flow rate, low pressure control of sterile liquids within both the biotechnical and pharmaceutical industries. Providing fully automatic operation, the 85000 eliminates the inefficiencies and poor control given by the manually-operated pinch valves typically used in these high value applications.

Compact and lightweight in design, the Baumann 85000 features three major components: a tube shell body that accommodates 19mm (¾") pharmaceutical grade tubing; a linear spring-and-diaphragm actuator that responds accurately to controller input; and a Fisher® FIELDVUE™ digital valve controller that yields a high level of operating performance as it maintains valve reliability.

The 85000 pinch valve with the FIELDVUE controller provides an installed equal percentage flow characteristic for control accuracy. The digital controller also enables valve diagnostics that monitor the operating health of the valve assembly, providing immediate feedback to a plant host system should maintenance be required. When incorporated within the PlantWeb™ digital plant architecture or other process control systems, the FIELDVUE controller-equipped 85000 facilitates and enhances per-batch and overall process record keeping.

The tube shell design of the 85000 allows easy replacement of the process tubing. The valve plunger



Emerson's Baumann™ 85000 sanitary pinch valve allows automated control of low volume, clean and sterile liquids

does not contact the process fluid and gives a shutoff rating equal to ASME/FCI 70-2, Class VI. The epoxy-coated actuator with its stainless steel fasteners offers maximum corrosion resistance.



Emerson Process Management
Tel: 0870 240 1978
Website: www.emersonprocess.co.uk

Crane Co. Acquires W.T. Armatur GmbH & Co. KG

Crane ChemPharma Flow Solutions™, a Crane Co. business and a leading provider of highly engineered products for fluid handling applications worldwide, is pleased to announce its acquisition of German valve manufacturer W.T. Armatur GmbH & Co. KG. Founded in 1978 and located in Maxdorf, Germany, WTA specializes in the production of bellows sealed globe valves and specialty change-over valves.

"This acquisition expands the CRANE ChemPharma Flow Solutions product portfolio of highly engineered valves for the global chemical industry. The addition of WTA's bellows sealed globe valve complements our existing product offering of low fugitive emission valve technology and aligns directly with our objectives

of providing solutions for demanding chemical and petrochemical applications," said Tom Pozda, President, CRANE ChemPharma Flow Solutions. *"We are excited to offer WTA products worldwide leveraging our combined global sales networks."*



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Review of RFID Technology For The Offshore Industry

In 2010 the RFID market growth was 14%. Interest in the Offshore Industry and associated Service Companies is gathering momentum.

In brief, RFID technology is proving to be successful and is definitely here to stay as it offers full traceability of assets such as drilling equipment, mechanical equipment, tools, process equipment, valves, maintenance activities and inspection. I will share some background information on RFID and examples in the industry where it has been successfully used.

Questions are often raised on what equipment an End User or Service Company has and where are they located? What condition are they in? Are full traceable maintenance / inspection records available and easily accessible? Do they comply with HSE, and industry regulations?

As an ex-End User difficulties often arose with the lack of reliable historical maintenance or inspection data. Lack of “live” reports hindered effective HSE and plant management. Often paper check lists were used which was time consuming. In addition quality management was lacking.

RFID is enabling management of the entire lifecycle of assets providing full control and visibility of locations, certification, inspections and maintenance. Also in the ever increasing HSE demands on the industry RFID enables full traceable audits in equipment manufacturer, plant construction, commissioning and operations.



So what's been happening?

Example 1

The recent Technical Conference in Houston presented some four papers on RFID applications. Several suppliers now offer this technology and foresee it

playing an important part in improving tracking of assets within the industry. The End User is now using RFID.

Example 2

Several reputable Distributors are now using RFID technology to track their valves.

A Distributor QA Manager said, *“Using RFID technology had made us realize that technology can only better our work environment. We are able to ensure quality control inspections are carried out, ensure the highest level of quality to our customers, improve the efficiency of our warehouse and manage our supplier’s performance. Also we are now able to prevent a NCR (Non Conformance Report) been given to us from our customers, we are able to know exactly where a valve is located in the warehouse, what condition it is in and trace all the inspection and test certificates relating to each specific valve.”*



Warehouse inspection activity

Example 3

A well known valve manufacturer uses RFID technology for all their valves to protect against Counterfeiting.

The valve manufacturer stated *“..... After being the target of several counterfeit valve manufacturers out of the Far East, we decided to fight back and find a way to protect ourselves and our brand from expensive legal battles as well as give our customers the assurance that they were indeed getting the correct brand from a qualified manufacturer in their operating unit. Adding RFID tag technology gives that knowledge and a surety level. With RFID tags and registration the customer can know for certain that he is receiving the correct*

product that is qualified, registered, and approved. The end user can rest assured they are protecting the integrity in their supply chain. This reduces risk of installing potentially unsafe, unknown products into major industrial complexes.”



Plant inspection of Relief Valves

Example 4

RFID technology has been used for detailed inspection of plant equipment to ensure compliance with the specification and site activities.



Plant inspection of Fire Hoses



Checking plant “Locked” / “Unlocked valves



Lifting Equipment



Typical inspection list

Example 5

In the Service sector using RFID technology on drilling equipment has enabled vast savings in materials controls.

Example 6

Safety has been significantly improved using RFID technology on lifting equipment. Errors in test protocol, test frequencies and certification have been removed.

Example 7

Also in the service sector equipment maintenance shops are using RFID technology to improve their in-house efficiencies.

What is the future of RFID technology?

RFID technology is currently expanding in several market segments including Construction, Rail and Mining in areas such as Inspections and on-hire/off-hire. Likewise various sections within the **Offshore, Petrochemical and Chemical Industry** are mobilizing. I envisage that this will continue.

BARRIE KIRKMAN

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Koso Kent Introl, Opens Third Factory



KKI's new 18,000 square foot factory

Koso Kent Introl (KKI), is making a seven-figure investment in its business that will increase manufacturing capacity, improve process efficiencies and maintain quality excellence, for the valve manufacturer.

The firm has opened a new 18,000 square foot factory in Brighouse, a few hundred yards from its original factory on Armytage Road; part of a significant investment programme within Yorkshire. The new factory is the company's third facility in Brighouse, where it has been based for over forty years. The new site is housing the aftermarket team responsible for service and spares, and creating additional capacity for scheduled shut-down or maintenance programmes that demand high volume turnaround in short timescales.

Denis Westcott, KKI's managing director said: *"We are fully committed to providing world-class service engineering and manufacturing practices for our oil and gas customers around the world. We recognise that to remain competitive and maintain our position as a global player, we need to continue to invest in our Yorkshire roots; that's in our people, processes, facilities and new machinery."*

Further works have already started at KKI's machine shop that is being reconfigured to accommodate the arrival of several new pieces of hi-tech machinery over the coming months, allowing the company to produce higher volumes in shorter timescales, whilst reducing waste.

Lynn Mowbray, KKI's operations director said: *"As part of our Continuous Improvement Programme across the business, it's essential that we have the ability to keep production in-house wherever possible to maintain a degree of flexibility and production scheduling. The new factory enables us to focus on the spares/service sector whilst the investment in the existing machine shop will increase our capacity."*

"Our investment in the latest machining centre and Integrex machine is going to make a huge difference to our operational capabilities, particularly for some of the high volume projects that we have on our order books."

KKI's investment extends to its on-site testing capabilities. Construction of a state-of-the art gas test facility, one of only a handful in the UK, is underway and is expected to be fully operational this summer. Having this capability in-house will enable KKI to control cost, time and quality across the KKI product range. It will also enable the firm to supply testing services to other manufacturers, for the first time.

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Crane Launches New Lined Pipe System

Crane ChemPharma Flow Solutions™ launches new lined pipe system for extreme temperatures - Resistoflex® ATL PTFE advanced technology liner

Crane ChemPharma Flow Solutions™, leading provider of highly engineered products for fluid handling applications worldwide, recently announced the introduction of its new Resistoflex® ATL Lined Pipe System with Advanced PTFE Liner.

Featuring an outer shell protection that delivers superior permeation control up to 450° F, the Resistoflex® ATL meets the most difficult temperature and pressure cycling requirements. Additionally, its PTFE liner offers a 60% reduction in permeation rate in aggressive chemical services at elevated temperatures. The new product line is a cost-effective solution for handling corrosion in severe service applications.

“The Resistoflex® ATL is a significant addition to our product portfolio and we are proud to introduce this heavy-duty alternative to the industry,” said Johnnie Davis, Resistoflex Business Line Manager of Crane ChemPharma Flow Solutions. *“By improving upon several aspects of the traditional lined piping system and using the finest materials and technologies available, we are able to provide the most cost-effective solution for severe service applications involving extreme temperatures.”*



Resistoflex ATL Lined Pipe System

Other features include a standard configuration that includes a premium paint system, vent couplings and PTFE vent extension for the ultimate in housing protection.

CRANE ChemPharma Flow Solutions

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As a major stockist of Parker A-Lok™ twin ferrule compression fittings and a complimentary range of instrument tube, Heap & Partners Instrumentation Division are now offering packs of pre-bent tube and fittings for actuated packages. Supplied in kit form, the tube is supplied to your specific requirements and comes with all necessary fittings for your installation, providing a ready made solution to reduce assembly time.

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We are also a main distributor for Parker solenoid valves and can provide a range of solenoids including NAMUR mount and stainless steel offshore specifications.



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ASCO Numatics Introduces ATEX Certified Valve Islands

ASCO Numatics introduces ATEX certified valve islands for mounting in fieldbus remote I/O cabinets. Unique features enable easier installation, commissioning and maintenance



ASCO Numatics introduces an ATEX certified solenoid valve manifold that is ideally suited to installation in cabinets containing fieldbus remote I/O

ASCO Numatics introduces an ATEX certified solenoid valve manifold that is ideally suited to installation in cabinets containing fieldbus remote I/O. The valve island is ATEX Certified for Zones 1 – 21 and has many unique features that reduce the cost of installation, commissioning and maintenance, and ensure minimal downtime.

The new ATEX valve islands enable pneumatic and electrical devices to be installed in the same cabinet – removing the need for bulkheads and electrical links

and providing significant savings for customers. They have many applications in pharmaceutical and fine chemical plants where ATEX devices are being installed to ensure higher safety and flexibility for batch processes.

The valve manifolds provide safety and flexibility and are fully assembled to reduce costs. The electrical and pneumatic connections are designed for speed and ease of use and the integrated isolation device allows maintenance without stopping the process. The Ex ia pilot is compatible with all remote I/O manufacturers.

The manifold features a simple electrical connection for four intrinsic coils/valves. The multi-pin IP20 removable plug can be pre-terminated if required and, because there are no terminal screws, connection is fast and reliable. The pneumatic connections are also quick and easy with a gasket on the sub-base allowing either direct side or base mounting. This space saving feature makes machine mounting easier and reduces enclosure costs.

Start-up is quick and easy with local LED and manual override for valve piloting control/diagnostic. An individual shut-off (hot swap) valve integrated into the sub-base allows the process to continue while one valve is being changed. The system is lockable to prevent accidental operation.

The four station sub-base with 8 station option, is available as a 5/2 single coil (monostable) version or spring return 3/2 function (by closing port 2). Each valve features an integrated shut-off device and is rated at +5°C to +50°C for a flow rate of 600 l/min.

The Ex ia pilot with low power (0.2W with LED), is compatible with all Ex ia remote I/Os and barriers connected to fieldbus (or point to point). With one unique valve covering a large range of actuators, stock management and inventory are reduced – providing cost savings for the user and distributor.

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Nuclear Industry Welcomes “Clear” Government Energy Framework



The UK’s civil nuclear trade association has welcomed today’s publication of the Government’s finalised National Policy Statements (NPS) following extensive public consultation.



Keith Parker, Chief Executive of the NIA

The NPS provide a “clear pathway” for the UK’s energy future, according to Keith Parker, Chief Executive of the Nuclear Industry Association.

He welcomed their publication, which provides the framework for planning for major energy infrastructure projects at a time when Britain’s generating capacity is set to diminish. The nuclear-specific NPS identifies eight sites deemed suitable by the Government for potential new nuclear power stations. The eight sites are: Bradwell in Essex; Hartlepool; Heysham in Lancashire; Hinkley Point in Somerset; Oldbury in Gloucestershire; Sellafield in Cumbria; Sizewell in Suffolk; and Wylfa on Anglesey. All sites are adjacent to existing nuclear sites.

“The Government is showing clear leadership at a time when the UK must move forward with major energy developments including new nuclear power stations. We will lose a quarter of our electricity generation capability by the end of the decade so we must be planning ahead to ensure our future supplies,” said Keith Parker.

“We warmly welcome the Government’s clarity and open and transparent handling of such key policy, and their acknowledgement that nuclear power is a hugely significant part of Britain’s energy future. Nuclear is vital in securing a low-carbon, stably-priced energy source into future decades, and we applaud the Government’s commitment in planning for that secure future.”

The NPS announcement is the first major nuclear policy announced by Government since the Fukushima incident that followed the Japanese earthquake and tsunami. Last month Secretary of State Chris Huhne laid before Parliament the interim findings of the UK’s independent nuclear regulator, Dr Mike Weightman into the events at Fukushima.

Huhne said at the time the circumstances surrounding the natural disaster in Japan “are far beyond the most extreme events the UK could expect to experience. In this respect Dr Weightman concludes there is no reason for curtailing the operation of nuclear plants or other nuclear facilities in the UK.”

The plans for new nuclear power plants are part of a series of national policy statements which were laid before Parliament today following an extensive public consultation. The next stage will see them debated and voted on in Parliament.

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Rotork CVA Electric Actuators Guards Against Oil Spillages

Failsafe duty for Rotork CVA electric actuators guards against accidental oil spillages



Dewatering packages under construction, with CVA actuators installed

Rotork's innovative CVA electric control valve actuator is providing a critical failsafe function on packaged oil-water separator (dewatering) units supplied to a refinery in Antwerp.

Manufactured by Facet, the dewatering units utilise a passive gravity-flow technique for separating oil and solids from waste water in storage tanks. Specially designed coalescing plates manipulate the flow of water, forcing the oil to the top and enabling the solids to sink to the bottom, whilst the cleaned water passes through. The filtered water is clean enough to be released into the environment.

The Rotork CVA actuators have been installed to guard against accidental oil spillages or contamination that could occur if the power or the control signal to the unit is interrupted. The explosionproof certified CVA actuators will immediately close valves on the water outlet and oil return lines if the power or signal is lost.

Rotork demonstrated that the compact CVA actuator design uses integral super-capacitors to enable failsafe operation, eliminating the inconvenience, cost and additional space considerations associated with separate battery packs or alternative back-up power sources, particularly in the hazardous environment of a refinery. In addition, programming the failsafe operation is a standard part of the CVA's non-intrusive commissioning routine, simplifying instrumentation requirements. Space was an important consideration in the overall design, since each dewatering unit is

packaged in a compact weatherproof housing with an external manifold for on-site pipework connections.

Rotork also promoted the adoption of a linear valve design for the application as an alternative to the rotary ball valve originally specified. With a stroke of only 7mm, the linear valve fully closes in only 1.5 seconds, instead of the 15 second closing time for the ball valve, providing increased failsafe response and security.

In addition to the convenience and speed of non-intrusive commissioning, the CVA also features built-in data logging, providing diagnostics to reduce the risk of unplanned process interruption. The actuators for this contract have been supplied by Rotork Holland for a total of eleven dewatering units.



A completed dewatering unit within its compact weatherproof housing

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Emerson Supplies Over 1000 Control Valves

Emerson Supplies Over 1000 control valves to help extend life of one of the world's largest natural gas fields

NAM maximises gas production and centralises control of production using Emerson's Fisher® control valves and AMS ValveLink™ predictive maintenance software.

Emerson Process Management has successfully completed a long-term project to help NAM (Nederlandse Aardolie Maatschappij) upgrade controls at its Groningen gas field in The Netherlands. More than 1000 of Emerson's Fisher® control valves help NAM control deliveries from individual well clusters to maximise output from the field.

NAM chose the Fisher control valves for the lower total cost of ownership made possible by the valves' performance and durability. Advanced diagnostics provided by FIELDVUE™ digital valve controllers also enable technicians using AMS ValveLink™ SNAP-ON™

software to easily monitor and maintain valve performance.

The Groningen natural gas field is one of the world's largest and has been in production since the mid 1950s. However, field pressure has been falling and NAM has been working with an alliance of contractors to optimise production by renovating the control and monitoring of 300 gas wells.

The wells are connected within 29 production clusters, with each cluster having an average of 10 wellheads. The improved control will enable an operator in a central location to start and stop individual clusters depending on its ability to deliver gas.

"We operate on day shifts only and aim to be fully automated," said George Verhagen, senior engineer control & automation, NAM. *"From a central location we can control the Fisher valves to turn individual clusters on or off to maximise output from the field."*

Centralised control also means that routine operator and maintenance tasks can be performed remotely, minimising visits to clusters. This also applies to the control valves on the field's gas compression facilities, which are equipped with performance monitoring and remote diagnostics. In the event of a production issue occurring



Emerson's Fisher control valves help NAM control deliveries from individual well clusters to maximise output from its Groningen gas field in The Netherlands

during the night, the system can generate an automatic alert that is sent to a standby off-site technician. Using remote web access, the technician can then log into the site's control network to diagnose and potentially fix the problem remotely.

In addition to troubleshooting, the predictive diagnostics are also being used to monitor the control valve condition over time.

"By using AMS ValveLink to compare the characteristics of each valve with how they performed during commissioning, we can easily see any degradation in valve performance and take corrective action as needed," continued Verhagen. *"We recognise the value of Emerson's diagnostics and are reaping the time and cost benefits associated with the move to predictive maintenance."*

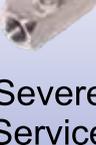


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ASCO Numatics Announces ATEX Approval for Valve Islands With G3 Electronics

ASCO Numatics announces that its Series 2005 valve islands with G3 electronics are now certified to ATEX category 3 zone 2-22 for explosive atmospheres, enabling the benefits of the G3 electronics to be applied to a wider range of installations. When mounted in an IP65 or Ex a cabinet, the valves are certified II 3G Ex nA IIC T4 Gc X for gas and II 3D Ex t IIIC T85°C Dc IP65 X for dust.

The Series 2005 valve islands with G3 electronics, offer increased intelligence in the form of new diagnostic functions and a graphic



ASCO Numatics Series 2005 valve islands with G3 electronics are now certified to ATEX category 3 zone 2-22 for explosive atmospheres

display in place of the usual LED indicators. The display supports plain-language messaging of diagnostic information at both the module and communication node level. The G3 Series product line is a completely modular system that uses an innovative clip design, allowing easy module removal/replacement without dismantling the whole manifold.

The ATEX certification covers 3/2-5/2-double 3/2 NC-NC – 5/3 valves over a temperature range of $-20^{\circ}\text{C} < T_a < +46^{\circ}\text{C}$ and a flow rate of 500 l/min. Each manifold can have up to 32 coils maximum with up to 16 coils energised simultaneously. Certification also covers the Ethernet/IP, Modbus TCP, DeviceNet and Profibus protocols, round M23 and sub-D 37 multipin connector and 16 and 8 way digital and analogue input/output modules.

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“The Good, the Bad and the Ugly”

A brief review of Valve Casting Weld repairs by Barrie Kirkman, BSc CEng MIMech, Executive Consultant to the Offshore, Petrochemical and Chemical Industry

A brief review of valve casting weld repairs as seen during my numerous audits. All foundries say they comply with ISO, API etc.....

API Resume

Some ASTM casting standards define major repairs and require stress relieving after the repairs are completed. There is no stress relieving requirements for weld repairs not meeting the major repair criteria. ASTM's A217, A995, and A494 define major repairs. ASTM A216 has the same requirement but does not use the term “major repair”. ASTM's A703 and A985 specifies major repairs shall be subject to prior approval of the purchaser but does not define major repair nor does it specify stress relieving after completion of repairs.

A Survey of Valve Manufacturers

A survey was taken and most valve manufacturers do not know if weld repairs and, more specifically, if major weld repairs have been made unless a requirement are included in the purchase order to notify purchaser. No one had any requirements for minor weld repairs.

Developing Valve Repair records

Ideally weld repairs of all pressure components should be undertaken against approved weld repair procedures, appropriate NDT and heat treatment when required.

What actually happens?

- In general the foundries establish “Minor” & “Major” repair criteria.
- Approval by the Purchaser before major repair is VERY RARE.
- Major repairs by the foundry “are reported” when required in Purchase order. However this is RARELY REQUESTED.
- In most cases weld repairs are left to the FOUNDRIES NORMAL PRACTICE.
 - o Weld repair practices vary widely and often do not comply with procedures
 - o Records vary widely from foundry to foundry
 - o Purchase requirements often get lost in the supply chain.
 - o Weld repair maps and analysis are the exception than the rule.
 - o All castings are repaired irrespective of casting defect size.

It is a real pleasure to audit foundries where weld repairs are typically less than 1.5 % and weld repair data are presented to substantiate such claims. In general investment castings weld repairs are less than sand casting weld repairs. Also geographically there are also some countries that are better than others. I have observed over that past 3 years, with the arrival of new foundries and use of modern technology in China, that the casting integrity gap between the East and the West is reducing. Also the supply of materials beyond carbon steel and low end stainless steels is gathering momentum.

Market information on minor and major repairs

General definition of “major weld repair” for WCB materials and similar

Defect

- > 20% of wall thickness
- > 25.4 mm in depth
- > Weld repair is more than 65 cm²

General definition of “minor weld repair” for WCB materials and similar

Defect

- < 20% of wall thickness
- < 25.4 mm in depth
- < Weld repair is less than 65 cm²

Note; There are variations to the above... 25%, 30%....10mm

Weld repairs can be up to 15% / 30% for minor weld repairs and up to 30% / 50% for major weld repairs for investment casting / sand casting respectively.

Some valve manufacturers take weld repair very seriously and they can show auditors how they achieve low repair levels. Regretfully though a very large market segment of the valve castings lack adequate control of weld repairs.

The photographs illustrate ‘The Good, The Bad and The Ugly’ for casting weld repairs and welding controls. I think most of the slides are self explanatory.

“The Good”; some examples showing excellent casting surface finish, good welding consumables in a controlled environment, recording of weld repairs and control of welding stubs.

“The Bad”; some examples showing uncontrolled weld repairs, flange surface repairs, quivers not heated and poor welding control.

“The Ugly”; some examples showing more uncontrolled weld repairs, ball repairs and unbelievable welding consumable controls.

Often I am challenged with my observations “When I visit foundries why is it that I do not see much weld repair”.

My response; There are possibly two answers to this question.

Answer 1; There are those foundries that indeed have minimal weld repairs and audits do show this. When you ask for repair data information is available to show the percentage of such repairs. This typically would be 1.5%. Also as you undertake your audit you can tell that this information is correct by looking at the castings within the total production line. How much weld repair is seen?

Answer 2; Unfortunately the foundry prepares for the audit. They tidy up the weld area, remove all weld stubs, brush the floors and remove the welders. When you ask for weld repair data there is great difficulty to present meaningful data. In some instances such data is just not available. Any given percentage of weld repairs given by the foundry is by observation. As already mentioned you can also see the quality the production valves.

Audit experience

On one particular audit the foundry stated that no weld repairs were undertaken on a particular valve brand. As I walk around one particular door of a building was closed. I noticed that the dust on the floor in front of the door indicated that something had been dragged along the ground. The door was locked. However the door three metres away was unlocked. I naturally went in to have a look. I found at least 25 cast valves stacked with weld repair markings of the brand concerned. I was informed that these valves were scrapped yet they were not in the appropriate “reject areas”.

On another audit I have seen “A4 folders” positioned at the weld repair area. The folders were brand new with just one page in. As I examined the information it was showing repair data for 2 days, May 2nd and 3rd. I was visiting on the 6th June. When I asked why the data was not up to date the reply was that no repairs had been undertaken since the May 3rd. My suspicion was that an important End User had audited the foundry on 4th May and the folder was presented for their benefit.

Conclusion

- Foundries are aware of API requirements for weld repair
- Interpretation of API requirements varies from

- foundry to foundry
- Foundry practices for weld repairs, NDT and heat treatment vary
- Weld repairs are often not on the End User / Purchasers “Radar Screen”

Questions?

- Is the above “Acceptable” and “Safe”?
- Should API or similar review their current requirements?
- Should End Users review their requirements?

The Good



The Bad



The Ugly



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Acquisition of Long-Standing Agent Creates Rotork Norway

Rotork is pleased to announce the acquisition of Valco Valves and Automation AS, the group's long-standing sales and service agent in Norway

Valco Valves and Automation, which will now be known as Rotork Norway, has over thirty years' experience of the valve actuation and control industries, encompassing sales, servicing, maintenance, repairs and total valve management. The business is based at a 900 square metre workshop facility in Agotnes near Bergen, which offers full service and overhaul support for all Rotork products, including large fluid power actuators. The company is particularly active in the offshore topside and subsea oil and gas industry, with six offshore trained staff enabling service work to be performed anywhere in the country – including the offshore sector – even at short notice.



Part of the busy Norwegian workshop facility, showing Rotork IQ actuators being fitted to valves for an offshore platform project.

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The acquisition enables Rotork to further develop its involvement in Norway through increased sales and service offerings for electric and fluid power actuation products, control systems and valve accessories.

Rotork Group CEO, Peter France, explained: "The acquisition of Valco Valves and Automation strengthens our presence in the important Norwegian market. Our strategy is to provide our customers with local support and this acquisition continues our international expansion plan. Please join me in welcoming General Manager Vidar Rossgård and his team to the Rotork family."

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Crane at First Valve World Americas Conference & Expo



Crane Flow Solutions showcases breadth of industry solutions at First Valve World Americas Conference & Expo

Featuring products from their extensive line of products for fluid handling applications in the chemical, petrochemical, oil & gas, power and refining industries, Crane ChemPharma Flow Solutions™ and Crane Energy Flow Solutions®, sponsored and exhibited at the first Valve World Americas Conference & Expo (June 21-22, Waterway Marriot Hotel & Convention Center, Houston, TX, USA; Booth #418). Crane also contributed its expertise to an onsite workshop entitled “The Good, The Bad & the Ugly of Partial Stroking,” where Crane representative Mike Brausch had served as a panelist as the benefits and shortcomings of partial stroking had been discussed.

At its booth, Crane displayed existing products from its many trusted brands across both the Crane Energy and Crane ChemPharma businesses. Brands on display included: Krombach®, Flowseal®, Duo-Chek®, Pacific Valves®, Center Line®, Resistoflex®, Xomox® and Saunders®. This show marked the introduction of Crane ChemPharma’s Resistoflex®ATL PTFE Advanced Technology Liner. It featured an outer shell protection that delivers superior permeation control up to 450°F; the Resistoflex®ATL meets the most difficult temperature and pressure cycling requirements. It is a cost-effective solution for handling corrosion in severe service applications.

“Crane is an active participant in the industry and we valued the opportunity to support the Valve World at its first American conference and expo, as a sponsor, exhibitor and workshop contributor,” said Bill Hayes, Vice President of Marketing, Crane ChemPharma Flow Solutions.

Other products Crane had showcased included its XOMOX® XLB Lined Ball Valve, Saunders® XA Diaphragm, the Krombach® Metal Seated Ball Valve, its Pacific® Hydrofluoric Alkylation Valves, its VOTES® Infinity Valve Diagnostic System, and its Technical Paper No. 410 (TP-410), a technical resource explaining the flow of fluid through valves, pipes and fittings. Several copies were raffled off for attendees each day.

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Croatian Water Treatment Plant Chooses Rotork Valve Actuators

Rotork RC200 series pneumatic actuators have been installed for valve control and operation in a new water treatment plant at the Sisak Power Plant, south of Zagreb in Croatia.

The Croatian national power company Hrvatska Elektroprivreda (HEP) has invested Euro 4 million in the new plant, which filters and demineralises water from the nearby River Sava before it is used for steam generation and media for the district heating system serving the city of Sisak.

The water treatment capacity is approximately 130 cubic metres an hour and the process is accurately controlled by RC200 valve actuators equipped with E4L limit switch boxes. The actuated



valve packages were carefully selected for reasons including reliability, environmental considerations and overall cost effectiveness.

Rotork RC200 series actuators feature a modern scotch yoke mechanism that provides a high start and end torque output in a very compact package. Pistons are guided in two places by high performance bearings which ensure proper alignment and long seal life.

The RC200 design has the lowest weight and the smallest external dimensions of any pneumatic actuator with an equivalent torque output. This contributes to a compact, lightweight and robust actuated valve package. In addition, the design has less stroke volume than comparable rack and pinion actuators, providing a considerable saving in the use of compressed air.

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Flowserve Signs agreement With Brazilian Pulp Plant

Flowserve announces agreement to provide valves for brazilian pulp plant

Flowserve Corporation recently announced it has signed a purchase agreement with Eldorado Celulose e Papel, S.A., a Brazilian pulp company, to supply control and on-off valves for a new plant.

This new plant, expected to be one of the world's largest single-line pulp plants when it becomes operational in October 2012, will be located in Três Lagoas, a city in the western state of Mato Grosso do Sul, Brazil. The plant is projected to have the capacity to process 1.5 million tons of dry pulp per year for export.

Under terms of the agreement, Eldorado plans to make future purchases of Flowserve NAF control valves, Flowserve Atomac, Flowserve PMV valve positioners and Flowserve Worcester Controls on-off valves, which will be used in the operation of the new plant after construction is complete. Flowserve signed the agreement in the second quarter of 2011 and expects to begin booking orders later in the year.

"This agreement is a testament to the strength of our product portfolio and our ability to provide local service to the customer through our local office in São Caetano," said Tom Pajonas, president, Flowserve Flow Control Division. *"We are pleased to supply the products that help manage the flow of pulp for such a ground-breaking project."*

Valves included in the order are expected to be manufactured at the Flowserve facilities in Linköping, Sweden; Ahaus, Germany; and São Caetano do Sul, Brazil.



Flowserve Flow Control
Tel: 01444 314400
Website: www.flowserve.com

Hobbs Valve Provide The Solution Yet Again

Hobbs Valve can now offer a product suitable for Fire Safe Certified Applications free of graphite eliminating the potential for Galvanic Corrosion between Duplex Valves and Graphite.

Offshore applications have an inherent safety need to be Fire Safe Certified ensuring critical valves are operable during and or after a fire event. This critical need offers an obstacle in choices of material whilst attempting to minimise or remove corrosive opportunities. Galvanic Corrosion has proven to be a Global Problem when in Sea Water applications and combined with Duplex Stainless Steel and Graphite.

Hobbs once again has stepped ahead of the class and approved a new innovative material selection that allows the use of non-graphite material but maintaining fire safe certification. Currently Hobbs is the only Triple Offset Butterfly Valve Manufacturer Globally capable of delivering such a result. Ashley Ford Product Engineering Manager states *"It is imperative in today's markets that End Users can rely on Manufacturers to deliver innovative results to solve long standing problems and make all attempts to reduce the cost of exploration in the offshore industry, it is because of this that Hobbs continually attempt to solve the customers need prior to being requested."*

Historically Graphite in certain service conditions would normally have been replaced with PTFE or RPTFE which only has a maximum operating temperature of around 260 deg C restricting its ability to become a true fire safe certified product in our valves.

Hobbs valve can now offer a range of Duplex and Super Duplex Valves that are graphite free and fire safe. The fire safe capabilities of these valves were confirmed by successfully passing the test requirements for confirming the pressure-containing capability of a valve under pressure during and after a fire in line with the international standard ISO 10497:2010 as witnessed by Lloyd's register.



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Colson – A Company Profile



A West Yorkshire based valve manufacturer is on the move again. Colson Industries Ltd who are one of the world leaders in the design and manufacture of instrumentation and bespoke valves for the Oil / Gas and Petrochemical industry have run out of space and it's only 8 years since they last moved.

In 1995 Mr Colin Smith-Moorhouse (Managing Director) was approached by former employees of his previous company with a view to set up a new valve manufacturing company. In 1996 Colson Industries Ltd launched its first range of valves into the marketplace from a small workshop based in Elland.

Since these humble times Colson Industries Ltd has not only increased their factory size but also their product range which now includes Ball, Needle, Check, Manifold, Monoflanges and Double block and bleed valves.

In 2003 Colson Industries Ltd moved to their current home situated at Park Works, unit 1, a 15000 ft² factory based in Elland, but due to their ever increasing

customer demands for new and larger valves, Colson Industries Ltd where running out of space and they knew the only way forward was more room and new machinery, so they started looking for a new factory in the of summer of 2010.

At the beginning of 2011 Unit 2 at Park Works became available so the decision to add 13000 ft² from Unit 2 to the existing 15000 ft² from unit 1 was an easy one to make, giving them a total of 28000 ft².

Colson Industries Ltd has already spent over £175,000 in the past few months on new machinery and there is more to come says Colin Smith-Moorhouse. The move will be completed by the end of July 2011.



Colson Industries Ltd

Tel: 01422 377999

Website: www.colson.co.uk

Rotork Delivers Isolating And Control Valve Actuation

Rotork delivers all-electric isolating and control valve actuation for gas plants



General view of one of the gas dehydration plants

Rotork actuators are fulfilling the all-electric specification for valve control on new gas dehydration units constructed at seven sites in the Transylvanian region of Romania. The new plants have been built for Romgaz, the largest natural gas producer in Romania, responsible for the production of around 40% of the country's consumption. Dehydration plants use triethylene glycol to remove the water from natural gas in order to prevent downstream processing problems such as freezing, corrosion and the formation of hydrates.

The specification for the new plants ruled out the use of air instruments and compressors, dictating the use of explosionproof electric actuators for isolating and control valve duties in the hazardous areas. This has been achieved with ATEX certified Rotork IQT isolating valve actuators and CVA control valve actuators. Both designs feature intrinsically safe, non-intrusive setting and configuration technologies, data logging for diagnostics and preventative maintenance planning,



Rotork CVA (left) and IQT valve actuator installations

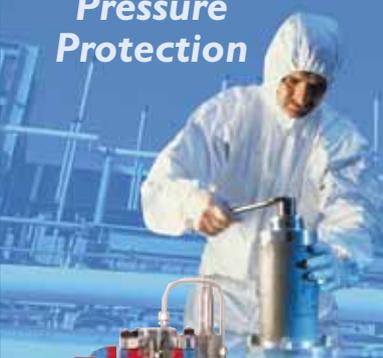
and double-sealed watertight environmental protection. The CVA offers a highly accurate and responsive method of automating control valves, without the complexity and cost of a pneumatic supply. With resolution figures better than 0.1% and the ability to eliminate position overshoot, the CVA helps to maximise product quality and plant capacity.

The electrical supply to the dehydration units is secured by means of a three-tier failsafe system comprising mains power supported by a 30kVA uninterruptable power supply and a 45kVA natural gas powered generator. Centralised control is provided by a Cytect SCADA system and ABB plc, housed in a control room adjacent to each plant. In addition, an Eex-e certified PC with mimic panel and identical graphical interface is located within each plant, enabling operators to work on the system in the field as well as the control room.

The main contractor for the project is Armax Gaz in Romania. Italian companies Pietro Fiorentini and TNC Tecnoconsulting have been responsible respectively for the process and base engineering and the automation and electrical devices, whilst a total of 76 IQT and 41 CVA actuators have been supplied by Rotork Italy.

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Flowserve Certified By Saudi Aramco

Flowserve announces certification to supply control valves to Saudi Aramco

Flowserve Corporation recently announced that its manufacturing plant in Dammam, Saudi Arabia, operated by Flowserve Abahsain Flow Control Company Ltd. (FLS/ABA), has been certified by Saudi Aramco for the supply of control valves. FLS/ABA is a joint venture of Flowserve and S&A Abahsain Co. Ltd.

The certification by Saudi Aramco allows valves produced by FLS/ABA at the Dammam plant, including Flowserve Valtek globe, ball, plug, butterfly and control valves for severe service, to be sold to Saudi Aramco. Flowserve and S&A Abahsain opened the joint venture Dammam manufacturing facility in the summer of 2010.

"Our continued investment in this joint venture underscores our commitment to the localization of our products and services to

fit the needs of customers in Saudi Arabia," said Tom Pajonas, president, Flowserve Flow Control Division. *"This certification by Saudi Aramco highlights our ability to manufacture high quality products and aftermarket solutions over the long-term life cycle of these plants."*

"This certification is a first step towards qualifying a number of Flowserve Flow Control valve and actuation products," said Shaukat Sheikh, director of Abahsain Group. *"With this certification, we will not only serve regional markets, but create long-term local Saudi job opportunities and critical technology transfer."*

FLS/ABA was formed early in 2009 to supply valves to the oil and gas, petrochemical, power and water industries. The Dammam manufacturing plant opened in the summer of 2010 and is a state-of-the-art, 55,000 square foot facility with capabilities for component machining, valve assembly, and testing. The Dammam plant also includes a fully equipped Quick Response Center (QRC) to provide service and repair support to Saudi-based customers. The QRC employs qualified valve technicians who perform valve repair and troubleshooting either in the facility or at the customer's site. The QRC maintains an inventory of valves and spare parts, which minimizes delivery lead times for customers.

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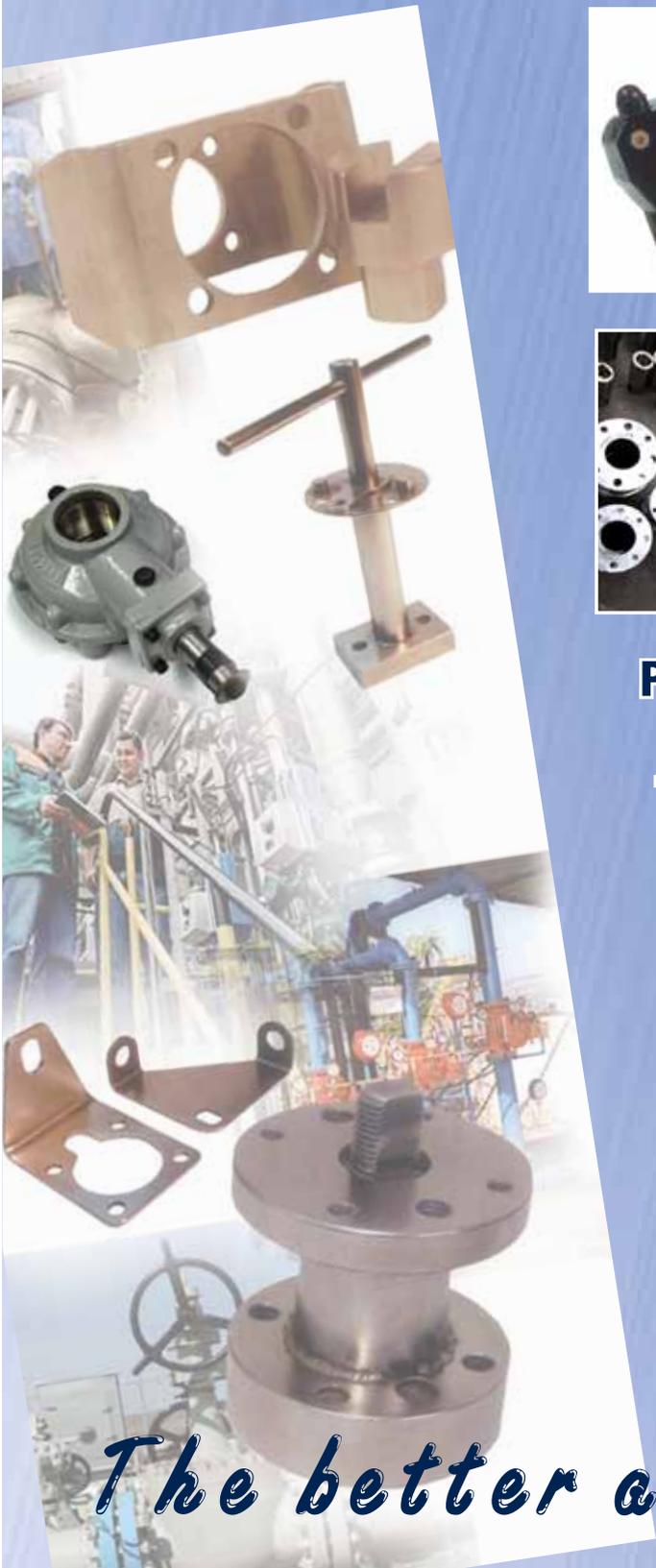
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The better alternative



The Circular World of SIL – Not just a one off!

Abstract

In this paper we consider the wider aspects of conformance with the requirements of BS EN 61508:2010^[1]. All too often the only part of the standard that is remembered is SIL (Safety Integrity Level), if we have a certificate that satisfies a SIL number between 1 and 4 then everything is fine and we can all relax.

That is not the case and this paper aims to show that the actual SIL number is only a relatively small part of the requirements of a lifecycle (or circle) starting with the determination of a target SIL (not considered here but for those unaware of the whole process this is the procedure for determining what the safety loop SIL should be), confirming initial achievement of that SIL and then, throughout the life of the safety function, continuously checking that the specified SIL is still correct and, essentially, being achieved on a daily basis. A never ending circle of activity.

Introduction

IEC 61508 has now been available for over ten years and has recently been revised (2010). Part 1 was approved for publication at first edition as long ago as December 1998; the first edition of Part 2 was published a little later at the end of May 2000.

All parts have now been revised and re-released in 2010 incorporating lessons learnt and focusing particularly on Functional Safety Management and its role in minimising the potential for ‘systematic’ failures. For instance, competence is now a ‘shall have’ and consequently companies involved in functional safety, at whatever level, must ensure that staff are trained and competent to fulfil their allotted responsibilities.

Despite the increasing age of IEC 61508 it appears to be a still very much misunderstood document. Most people are probably aware that the standard covers Functional Safety, is particularly applicable to electrical and electronic systems and uses a risk based approach. Importantly it is considered ‘good’ practice, by those in the legal field and has been referenced in all recent ‘accidents’ such as Buncefield (Milton Keynes, UK), BP Texas (USA) etc. Should your plant be the one unfortunate enough to suffer a serious accident then litigation may well follow against persons and companies who see fit to ignore it.

The objective of this paper is to discuss the less well known aspects of compliance with the aim of providing education to those too busy to read the whole standard itself and hopefully to provide a wider understanding of the requirements beyond the SIL number.

The circular world of SIL - SIL calculation

SIL applies to an instrumented loop, NOT a single component. A single component, such as the Moore Industries International, Inc Safety Trip Alarm (STA) trip amplifier can only have the capability to work in a SIL x loop. Whether or not the ‘loop’ achieves SIL x depends on the result of the calculation, sum of ‘dangerous’ failures for the loop multiplied by the ‘channel equivalent mean down time’ (t_{CE}). This calculation gives us the **Probability of Failure on Demand (PFD)**. PFD is related to SIL by table 2 of BS EN 61508-1:2010 (Para 7.6.2.9).

The failure rates must of course take into account the modes of failure which would prevent the ‘loop’ performing its designed safety function.

Safety Integrity Level	Low demand mode of operation (Average probability of failure to perform its design function on demand)
4	$\geq 10^{-5}$ to $< 10^{-4}$
3	$\geq 10^{-4}$ to $< 10^{-3}$
2	$\geq 10^{-3}$ to $< 10^{-2}$
1	$\geq 10^{-2}$ to $< 10^{-1}$

I have chosen the Moore Industries International, Inc. Safety Trip Alarm (STA) as an example which is quoted as having failure rates as follows:

$\lambda_{DU} = 84.2\text{FITS}$ (Dangerous undetected failure rate)
 $\lambda_{DD} = 188\text{FITS}$ (Dangerous detected failure rate)
 $\lambda_{SU} + \lambda_{SD} = 927.9 \text{ FITS}$ (Safe failure rates both undetected and detected)

(Note that a FIT = 1×10^{-9} failures per hour)

Assuming a proof test interval (T1) of 1 year (8760hrs) and a Mean Time to Repair (MTTR) of 8 hours it is possible to calculate t_{CE} (the channel equivalent mean down time);

$$(\lambda_{DU}/\lambda_D)(T1/2+MTTR) + (\lambda_{DD}/\lambda_D), \text{ where } \lambda_D = \lambda_{DU} + \lambda_{DD}$$

$$84.2/(188+84.2) \times (8760/2+8) + 188/(188+84.2) \times 8$$

$$= 0.309 \times 4388 + 0.69 \times 8$$

$$= 1361.5 \text{ hrs}$$

$$PFD_{AVG} = (\lambda_{DU} + \lambda_{DD}) \times t_{CE}$$

$$= ((188+84.2) \times 10^{-9}) \times 1361.5$$

$$= 0.00037$$

By reference to the table reproduced above, it appears that the SIL capability (according to PFD) of the STA is SIL3. In a typical loop, published data indicates that some 35% of failures are due to the sensor, 15% due to the logic solver and 50% due to the final actuator; it is therefore necessary to consider whether the PFD of 0.00037 is consistent with this unwritten requirement. As 0.00037 is just outside of 35% of the SIL3 band then it would be good practise to claim only SIL2 – as Moore Industries have done.

Of course this numerical analysis is only one part of the assessment (four parts) and only the lowest may be used for identifying a SIL capability.

The second part of the assessment is **Safe Failure Fraction** (SFF, Tables 2 and 3 of BS EN 61508-2:2010, para 7.4.4.2.2).

$$SFF = (\lambda_{SU} + \lambda_{SD} + \lambda_{DD}) / (\lambda_{SU} + \lambda_{SD} + \lambda_{DD} + \lambda_{DU})$$

$$SFF = (927.9 + 188) / (927.9 + 188 + 84.2) = 92.9\%$$

The STA is a Type B device according to BS EN 61508 as its failure modes cannot all be completely determined (BS-EN61508-2:2010, 7.4.4.1.3)

Using table 3 (of BS EN 61508-2:2010) for type B devices it can be seen that a SFF of 93% for a single loop unit gives a SIL capability of 2.

The SIL capability of the STA can then be used in a safety function up to and including SIL2 in a 1oo1 architecture (1oo1 refers to a single device in a non redundant instrument loop). If the software/firmware of the STA is capable of SIL3 then the STA might also be used up to SIL3 providing that the architecture is a minimum of 1oo2, i.e. at least two voting units are used.

It is necessary for the software/firmware to achieve SIL3 because the potential for systematic failure of the STA 'installation' must be capable of SIL3. The systematic failure capability is assessed under BS EN 61508-3:2010 and the Techniques and Measures tables of both BS EN 61508-2 and -3.

There is independent third part evidence available to show that the STA passed these tests comfortably and as this paper is not particularly concerned with these aspects we will accept that the systematic capability of the STA is SIL3. It can therefore be used to SIL2 in a 1oo1 architecture and SIL3 in a higher architecture.

So that completes the task of SIL, or does it.....

The circular world of SIL - Maintaining SIL

Unfortunately, SIL is NOT a constant characteristic...IT HAS TO BE MAINTAINED.

When first installed and commissioned the loop must be working correctly (assuming a competent test and installation resource) and therefore may be assumed to have achieved the calculated and required SIL. However, as SIL is, to a large extent, related to random failure rates then after commissioning the potential for random failure is ever present. It is known that the life of most components can be represented in a graph of the shape of a bathtub, initially the component is vulnerable to so called infant mortalities and this explains the sharp initial high rate of failure (relatively) before the steep plunge of the curve into the bathtub shape. At the bottom of the bathtub the failure rate is more or less constant for the useful life of the product and before wear out mechanisms start influencing reliability causing the curve to rise out of the flat bottom of the bath.

So two issues are raised here and must be dealt with by the 'safety manual' that is required to be provided with a SIL capable component:

- What is the manufacturer's prediction of the length of normal operational time before wear out mechanisms might be expected to start?
- Once commissioned what is the frequency of proof testing recommended by the manufacturer to avoid the possibility of an undetected dangerous failure being present when a demand is placed on the host safety system?

The first should be a recommendation appearing in the safety manual provided with the loop component and might consist of such items as relay contacts, batteries, electrolytic capacitors and switch contacts. Unusually in these days of integration it might be possible to replace vulnerable components before their life's end but more likely technology will have moved on or the cost of replacement work would not be cost effective.

In the second case, it should be possible to present a curve representing proof test interval against PFD.

Figure 1

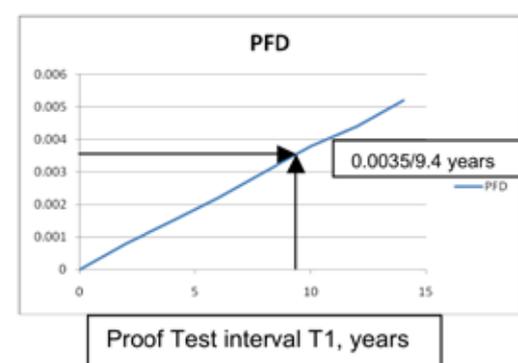
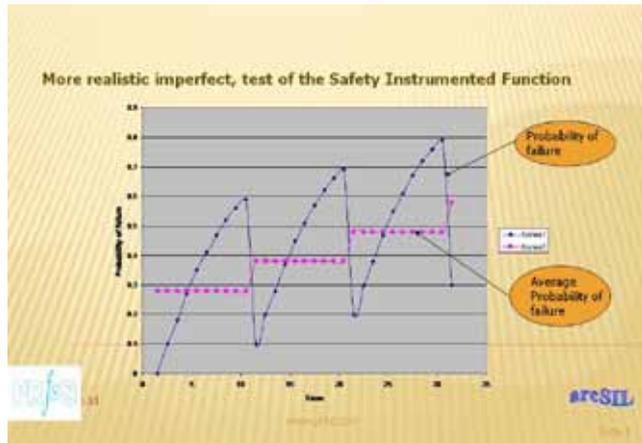
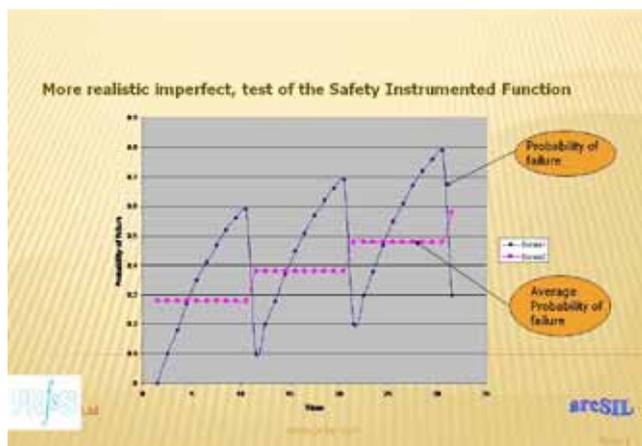


Figure 2



What happens if the proof test is NOT a thorough test, i.e. the device is not 100% tested to reveal dangerous faults? In this case the PFD is not set to zero but some other figure between 0 and 1 and consequently, assuming the same time is left between proof tests, the instantaneous probability of failure on demand will be higher – as shown by the sawtooth shape below.

Figure 3



This should explain the reasoning behind PFDG, the average PFD. Where the proof test is 100% thorough then the PFDG is constant, where it is less than 100% the PFDG slowly increases – and obviously increasing PFD implies that after some time T_z the PFD will exceed the SIL limit originally calculated. This time may eventually be before the nth proof test! With some potential consequence.

Continuous confirmation of SIL – OR Closing the loop

During the estimation of safe and dangerous failure rates a competent engineer will have listed all the components within the device concerned and allocated failure modes and failure rates to each and every component. Failure Mode Effects Analysis (FMEA) reveals safe and dangerous failure rates for each mode of operation that the device is capable of. In the case of the MII STA this is limited to High trip and low trip. For more complex devices there may be more modes of use.

The failure rates used for the FMEA will have been obtained from a reputable source (for the STA this is Siemens SN29500:2004 for example). Such sources are statistically based and consequently cannot be precise. The next task of the SIL loop owner is to collect thorough failure rate, failure mode and operational time data for the safety loop concerned. This data is an implicit requirement of BS EN 61508-2:2010, 7.6.2.1.c. This data is essential to confirm that the assumptions of the FMEA are reasonable. If failure data is worse than assumed then this may mean that the required loop SIL is NOT being maintained and this means that the protection provided by the loop is less than adequate – a dangerous situation. The end user has a responsibility to collect system failure rate data and be able to demonstrate that target dangerous failure rates are not being exceeded. This is not ‘gut’ feel or circumstantial qualitative evidence BUT HARD FAILURE RATE DATA periodically fed back to the designers to confirm that the original SIL is being continuously achieved. It is not well understood that feedback of failure data is part of the life cycle requirement and obligation from user to manufacturer.

Note that this process also applies to demands on the safety system; if the number of demands is higher than predicted during HAZOP and SIL determination then again the loop SIL calculations must be repeated to confirm that existing installed safety systems are still adequate.

Spurious trips and profitability

The FMEA work referred to earlier produces additional results besides dangerous failure rates but these don’t appear in the calculation of PFD, only SFF. What are they and what do they mean?

The additional failure rate data is:

$$\lambda_{SU}, \lambda_{SD} \text{ and } \lambda_{no\ effect}$$

$\lambda_{no\ effect}$ is derived from those component failure rates that DO NOT CONTRIBUTE TO EITHER SAFE OR DANGEROUS FAILURES (See BS EN 61508-4:2010 – para 3.6.14) and should not be used in the calculation of SFF. Watch out for FMEAs that have used these failure rates to inflate SFF!

λ_{SU} and λ_{SD} are safe failures which cause the associated safety system to perform its design function – but unnecessarily! The end user wants his safety systems to protect his plant and his employees and the environment; he does NOT want it to ‘spuriously’ stop production at the cost of possibly millions of dollars, pounds, Euro’s (etc).

Safe failures are a characteristic of each component in the safety loop, they can only be reduced by attention to design. The MII STA exhibits a safe failure rate of 928

FITs. This may be interpreted as a Mean Time Between Failures, safe (MTBFsafe) with the relationship

$$MTBF_{safe} = 1 / (\lambda_{SU} + \lambda_{SD})$$

This equation is an approximation only and must be used with care. It is an acceptable approximation ONLY when the failure rate of a device is CONSTANT as it is (approximately) at the bottom of the bath tub curve. *Note that by inference there is a similar value for MTBF dangerous.*

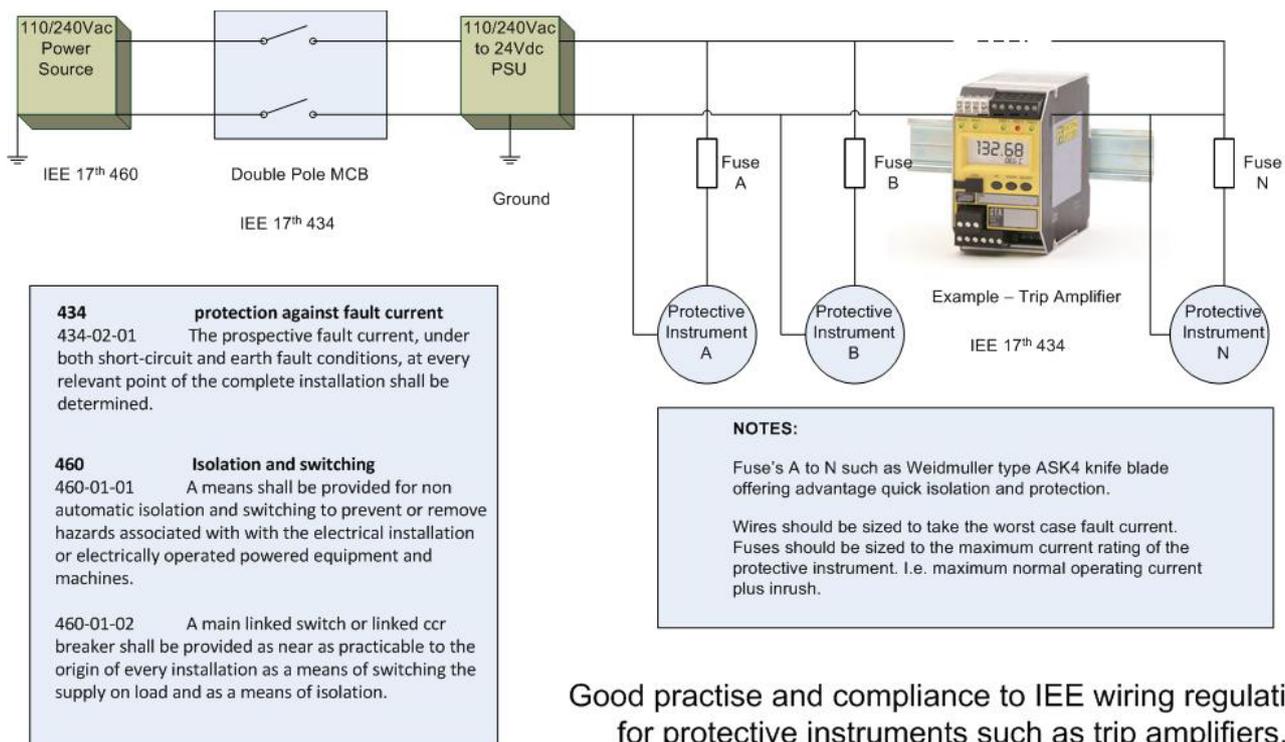
If we assume that this is the case then the STA MTBF(safe) is $10^9/928 = 1077586$ hrs (123 years) or 0.93 failures per million hours ignoring wear out mechanism's. It is reasonable to assume therefore that within the period after infant mortality, and before wear out may be expected, the potential for spurious trip due to STA failure itself – is extremely low.

However, this does not remove from the installer the responsibility to consider other issues that might also cause spurious trips (competence of personnel is not only sensible good practise but a mandatory compliance written into the new edition of BS EN 61508). Poor fuse choice, poor MCB rating or characteristics, poor choice of power supply can all increase the potential for spurious trips though fortunately only a small proportion of power supply failures might cause a dangerous failure they are certainly a common source of spurious trips.

An obvious starting point is choice of signal type and selection of appropriate wiring. Wherever possible a low impedance signal source should be used as induced emf's are damped by low impedance, so 4-20mA signals for long transmission paths are a must. Use of thermocouples with very long lead lengths must be considered carefully as they are a low voltage source (7uV to 75uV per 1°C). Wherever possible (temperatures up to approximately 800°C) a resistance temperature detector (RTD) is a better choice as it results in typically mV signals per °C. Whatever sensor type is used, if the signal is low voltage then screened twisted pair cable is a must, together with segregation between power and signal cabling. With 4-20mA signals this is less important but is still a sensible precaution against radiated interference which can cause spurious trips.

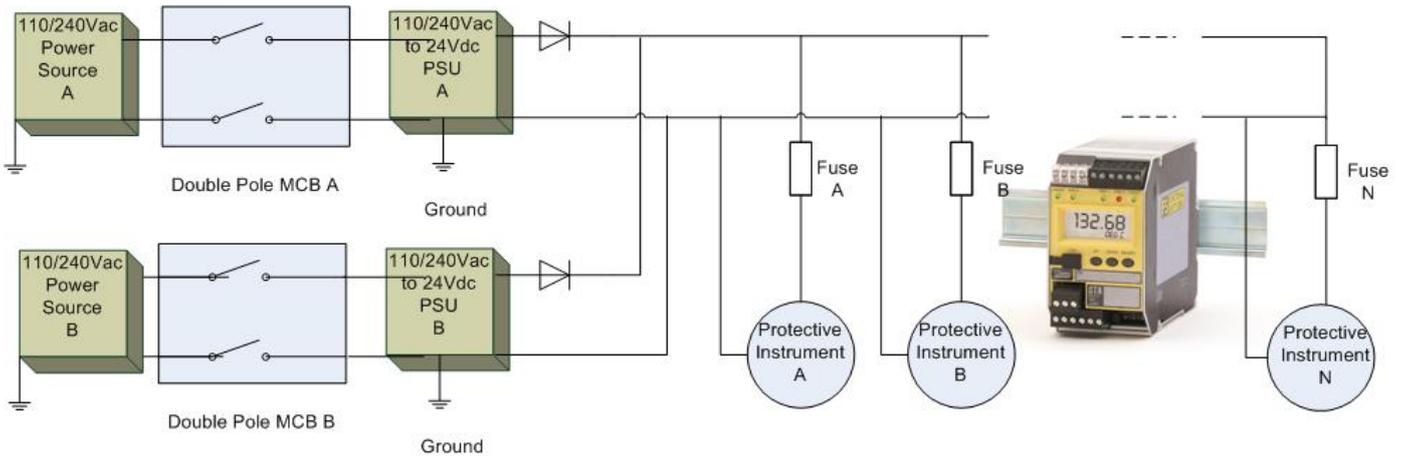
Figure 4 presents an arrangement that is the minimum required by the current IEE Regulations 17th Edition^[2]. A high voltage power source is isolated from the safety system by double pole MCB of adequate working voltage and trip current; a switch mode power supply converts down to 24Vdc and provides a safe working voltage at the loop level; Individual fusing on instruments ensures that one faulty instrument does not remove more than one layer of a safety system provided an adequate safety level is still provided by the other loops being supplied. In some high risk cases it may be preferable for a single fault to trip the safety function and close down the process. Figure 4 (See below).

Figure 4



Good practise and compliance to IEE wiring regulations for protective instruments such as trip amplifiers.

Figure 5



For enhanced availability in the face of power supply or spurious fuse failure then it is better to provide redundant power supplies supplying 24Vdc through a diode unit, ensuring that the safety loop can function normally even in the face of a single power supply failure. Where redundant power supplies are used then it would be wise to provide alarm of power supply failure to the host to ensure that failures are corrected before a second failure can shut down the plant with consequent financial loss. See Figure 5 (above).

In summary

- We have shown how a set of failure rates may be interpreted to predict a SIL capability.
- We have also shown that the SIL is only transient unless effort is made by competent persons to maintain the SIL capability by thorough 100% proof testing.
- We have explained that it is essential to capture 'actual' failure rate data during operation and feed it back to compare with the original predicted failure rates to ensure that the 'actual' failure rates are no worse than assumed in the FMEA and SIL assessment. If they were found to be worse then the protection provided by the safety loop would not be as specified and other steps may have to be taken to achieve the required safety level.
- We have identified that the design and installation of the safety loop can be very important to efficient financial operation of the process plant and that functional safety is in addition to regulations for safe installation.
- We have noted significant changes in the 2010 edition of BS EN 61508 introducing new requirements for FMEA – 'No effect' failures must **not** be included as 'safe' failures to boost SFF claims; companies involved in functional safety must have a functional safety management system in place to control the design, manufacture, installation, modification and operation to minimise the potential for systematic failure in Electrical/Electronic/Programmable electronic safety-related systems and individuals responsible for functional safety must have demonstrable competence in their field of expertise.

Acknowledgements

Many thanks to Moore Industries-International, Inc (www.miinet.com) for their co-operation in providing the functional safety data used in this paper and to Mr Paul Reeve and Dr Hassan El Sayed of SIRA for their helpful comments and guidance.

About the Author

Mr P R (Bob) Smith is a Chartered Engineer and a member of the IET, a Fellow of the InstMC and acts as Independent Consultant in Functional Safety (www.prfss.com).

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- [1] International Electrotechnical Commission, "Functional Safety of Electrical, Electronic, and Programmable Electronic Safety Related Systems", IEC 61508, Parts 1 to 8, 2010
- [2] British Standard Requirements for Electrical Installations, IEE Wiring Regulations Seventeenth Edition; BS7671:2008.

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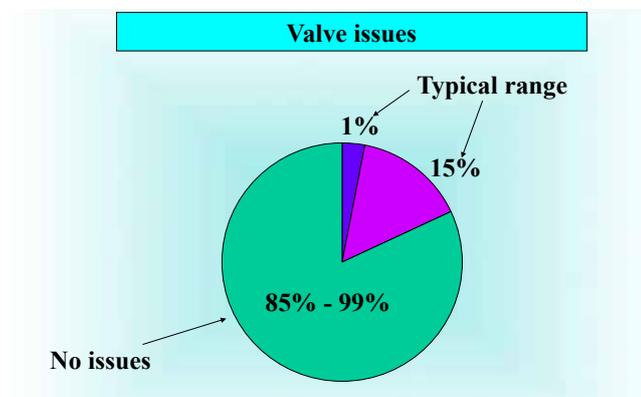
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Generic Review of Valve Issues Facing The End User Today

I am now in my 40th year in the industry and would like to share some generic data concerning issues facing the industry today.

General valve issue data

The data for issues experienced during plant operation is summarized in Slide 1. Typically somewhere between 1% to 15% of valves generated issues, with no issues between 85% & 99%. This is a broad base data which covers specific project valves to regular maintenance valves. I know all the readers would put themselves at the 1% issue level but I have to give some push back here as these clients are limited. *At a recent conference in the USA there is a lobby of End Users that believe that the situation is far worse than suggested.*

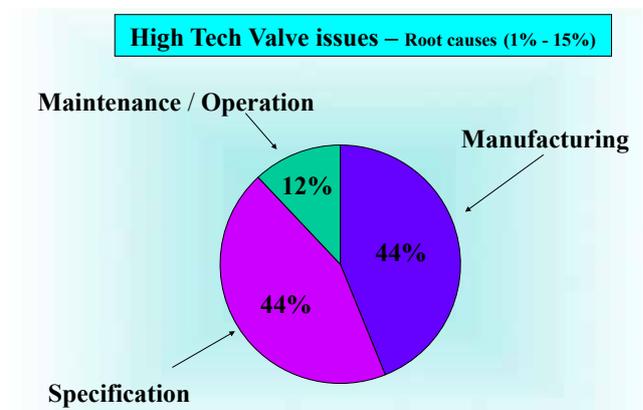


Slide 1

High Tech Valve issues – operations versus manufacturing

Slide 2 shows further details for “High Tech Valve” issue. Here we begin to see some interesting data. 12% of the valve issues can be attributed to poor / lack of maintenance or incorrect operational procedures. 44% can be allocated to manufacturing issues with the remaining 44% to incorrect specifications.

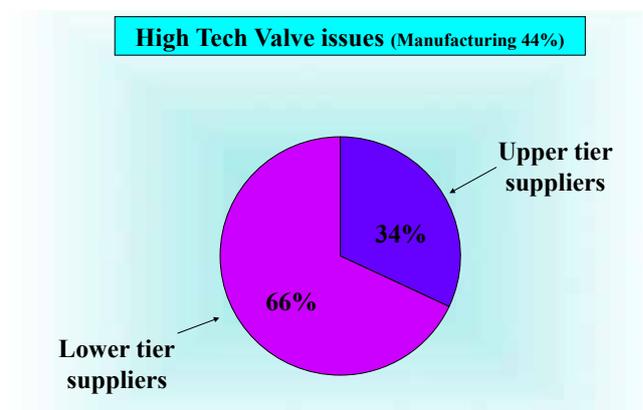
Now let’s just think about that data. 56% of the issues can be directly linked back to the End User! Only 44% of the issues are linked to the manufacturer.



Slide 2

High Tech Valve Issues – Upper Tier versus Lower Tier manufacturers

Slide 3 shows of the 44% of manufacture issues 34% can be attributed to “Upper Tier” manufacturers and the remaining 66% to “Lower Tier” manufacturers.

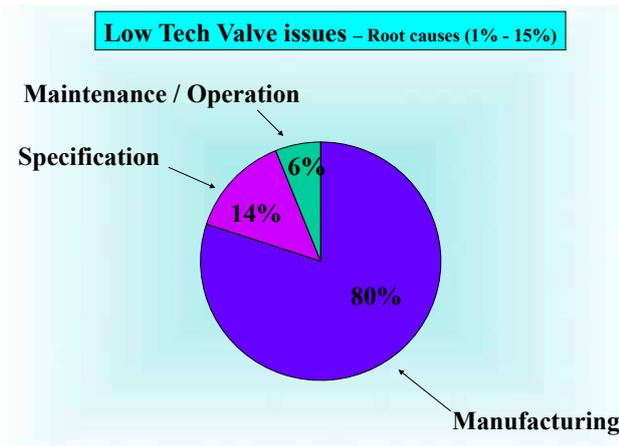


Slide 3

Low Tech Valve issues – operations versus manufacturing

Slide 4 shows further details for “Low Tech Valve” issue. 6% of the valve issues can be attributed to poor / lack

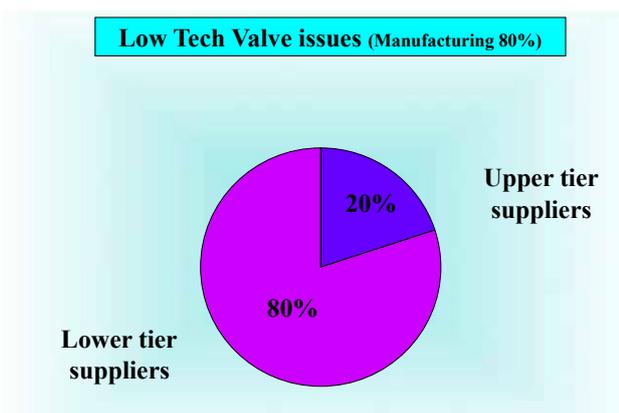
of maintenance or incorrect operational procedures. 80% can be allocated to manufacturing issues with the remaining 14% to incorrect specifications.



Slide 4

Low Tech Valve Issues – Upper Tier versus Lower Tier manufacturers

Slide 5 shows of the 80% of manufacture issues 20% can be attributed to “Upper Tier” manufacturers and the remaining 80% to “Lower Tier” manufacturers.



Slide 5

Comparison of the Low Tech Valve issues versus High Tech issues shows obvious trends. The influence of the End User on the issues is lower but surprisingly still present. Also the Lower Tier manufacturers are more evident which reflects market trends.

Failure examples – End Users fault???? – Manufacturer fault????

I had recent experience of a high pressure ball valve explosive decompression (“ED”), failure due to incorrect specification. The full process conditions had not been specified correctly.

In another example a bellow seal valve bellows failed. The actual cyclic conditions were assumed rather than being checked.

Again a ball valve seat leaked due to incorrect seat materials being specified for the operating temperature.

A Double Block and Bleed valve failed due to incorrect internal design and manufacturing tolerances. The investigation revealed that the manufacture had been sub-contracted and poor quality control was evident.

An actuated valve failed to operate correctly. It was first thought that the error was under design of the actuator but the cause was due to poor valve stem clearance.

Needless to say many issues consistently cross my desk. Issues with casting leakages and weld repairs for example.

Generic Issues facing End Users in 2011

Please see below generic issues facing End Users in 2011. Each End User is tackling them in various ways. Some are reactive while some are proactive.

Actuator issues
Casting leakages at hydrotest
Casting leakages in service
Catastrophic failures
Corrosion, internal & external
Incorrect bonnet bolt torques
Incorrect internals
Incorrect chemical analysis
Incorrect heat treatment
Non compliance with API or similar
Poor design
Poor impacts
Poor mechanicals
Poor painting
Poor tolerances
Sealing material issues, poor graphite or white products
Valve by passing
Uncontrolled weld repairs
Valve sticking
VOC leakage
Wrong certification

In conclusion valve issues are still evident in the industry today and I observe that as End Users continue to seek cheaper low tier suppliers the overall situation will not change in the immediate future. To the contrary it may take some time.

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Rotork Actuators in Waste Water Treatment Project

Rotork valve actuators in 'landmark' waste water treatment project

Rotork IQPro intelligent electric valve actuation technology will assist the operation of the largest and most advanced waste water treatment, water reuse and sludge treatment plant in the Middle East.

Described as a 'landmark' project, the Doha North Sewage Treatment Works in Qatar has a peak waste water treatment design capacity of 439,000 cubic meters per day, serving a projected population of 900,000 by the year 2020. Advanced membrane and ultra-violet treatment technologies are being utilised to reclaim high quality water for non-potable purposes, thereby freeing-up precious drinking water supplies for the community.

The site's sludge treatment plant will also receive and treat sludge from waste water plants throughout Qatar, the treated sludge being used as an organic fertiliser or a source of green energy. Defined as a model project of sustainable development for communities worldwide, Doha North STW is being constructed a partnership between Keppel Seghers, the environmental engineering arm of



Rotork IQPro actuators fitted to gate valves in sizes up to DIN 1800, destined for the Doha North Sewage Treatment Works. (Photograph by kind permission from Glenfield Valves Ltd)

Keppel integrated Engineering, and the Public Works Authority of Qatar.

Rotork IQPro actuators feature an IP68 watertight enclosure with non-intrusive setting, commissioning and interrogation technologies. An illuminated window displays setting prompts and confirmation of setting data, local and remote control status and additional data including valve torque/position profiles. The hand-held setting tool, featuring bidirectional non-intrusive infra red communication, facilitates on-site actuator configuration with or without mains power connected.

Bidirectional communication enables data to be retrieved and retransmitted to other actuators, saving immense amounts of time when many valves require near-identical commissioning. In addition, actuator data logger files can be downloaded and transported from plant to office for storage and analysis on a PC running Rotork IQ-Insight software. Effective asset management programmes can then be planned and implemented, maximising plant utilisation and minimising the risk of unexpected plant interruptions.









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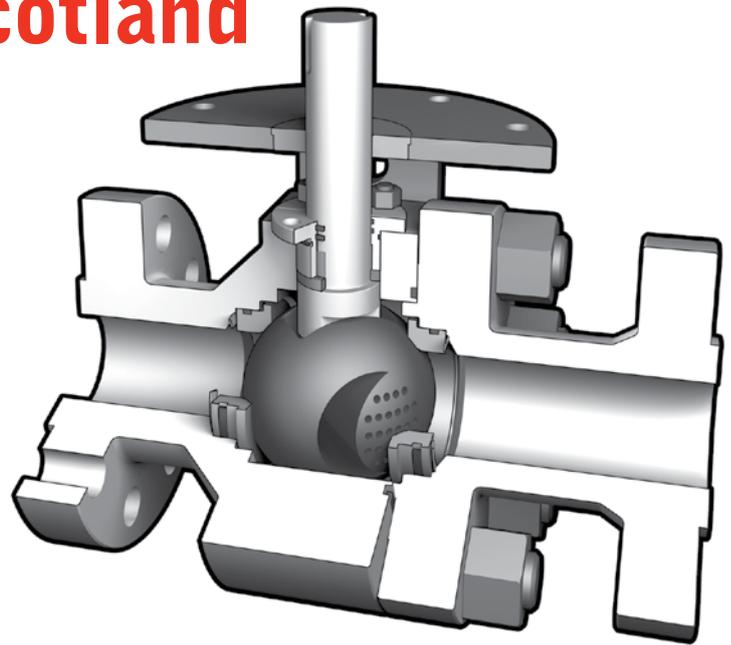
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Induchem Partners With MOGAS to represent FlexStream® Technology in Scotland

Induchem (UK) Limited and MOGAS Industries, Ltd. have made a representation agreement enabling Induchem to represent MOGAS' high performance FlexStream® severe service control valve technology in Scotland.

Initially, the agreement will cover the oil and gas industry in Scotland including end users and engineering contracting houses. Major gas plants St. Fergus and Mossmorran will also be included with gas transportation and gas compression systems and new construction and MRO projects.

MOGAS is well known as a leading manufacturer of severe service ball valves for high pressure, high temperature and harsh service applications.



FlexStream technology uses a patented rotary control ball valve to control the high pressure differential that occurs in many severe service applications. It has a smaller dimensional envelope than most traditional linear globe control valves to reduce the costs associated with valve construction, piping layouts and materials.

Revolutionary design

Kevin Jackson, MOGAS Product Manager and VP of Sales, explains the benefits of the design, "FlexStream is a revolutionary control valve technology for the gas, power and refining industries. It has a ball or metal seat that can be customised to suit high pressure differential applications to give increased flexibility and more control. Its compact design gives the cost-savings of a smaller dimensional footprint."

Induchem is a worldwide valve and actuator business with UK, Ireland, global and engineering services divisions. The company supports leading process industries across the world and has exclusive partnerships with leading process equipment manufacturers.

Effective alliance

Both Induchem and MOGAS are excited by the opportunities the new alliance brings. Tony Hendzel, UK Sales Manager of Induchem says, "This alliance is a great match and means we can give our customers innovative technology from MOGAS backed by Induchem's world-renowned expertise. Feedback so far is highly positive and we're delighted to expand the range of best-of-breed products we offer our clients."



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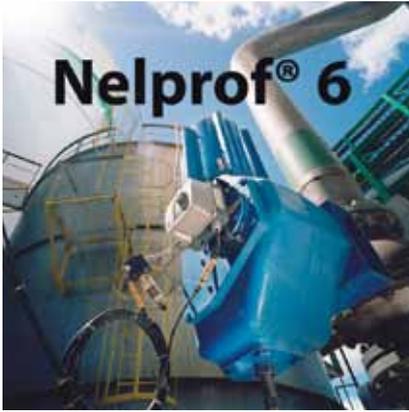
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New Metso valve selection software Nelprof 6

First on the market for safety valve optimisation



Complete selection tool for all intelligent automated process valves

Metso has released Nelprof 6 valve sizing software. The new version extends earlier Nelprof™ versions with two new calculation modules, which enable the selection of intelligent automated on/off valves and emergency valves. Special safety requirements, such as an actuator-sizing

safety factor or a complete valve-assembly safety-integrity level, can be evaluated with the new state-of-the-art tools in the program.

Control valve selection with performance analysis

Nelprof, with its advanced control-valve selection features, was first introduced in 1981. Now Nelprof 6 can be used to select all Metso's automated on/off and emergency valves. Performance analysis, which has been one of the value-adding features in the control-valve sizing tool since 1980's, can be used to study valve controllability

in a closed control loop. The module also includes multi-phase flow sizing as well as noise and cavitation prediction analysis.

Fast and reliable on/off valve selection

This on/off calculation tool allows the selection of all Metso metal- and soft-seated on/off valves with advanced but easy-to-use actuator sizing including adjustable safety factor and torque key figures. By using the tool, you can select the actuator more quickly and accurately in the engineering phase, compared to conventional actuator selection. You can also use the mass calculation tools to work with a number of items even more efficiently. Documentation and revision of the sizing is, of course, also possible whenever needed in the later phases.

First on the market to optimise safety-critical system components in valve selection

The SIL module for final element PFD (Probability of Failure on Demand) calculation allows both 1oo1 and 1oo1D (D standing for diagnostics) final-element calculation that takes into account the use of a valve, an actuator and the market-leading partial-stroke test device Neles ValvGuard™. In addition, one to several pneumatic components can be taken into account in the calculation.

These two new modules help to reduce engineering time in the selection of on/off and ESD valves by providing field-proven-based information. Easy to use and reliable in results – with all the relevant parameters on your screen and printouts – you can avoid many mistakes and work more efficiently by using the tool. Nelprof™ software - utilizes intelligence based on several decades of real life experiences to help you to size and to select the best valve solution for each application.



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CVS Appointed Approved Service Provider



(L-R) Mick Beavers, Managing Director, Control Valve Solutions (CVS), Lucy Brown of Fisher; Steve Barford of ASCO, Mac Stevenson, Sales Manager of CVS, Jim Gordon of Topworx and Richard Grace of Fisher

Control Valve Solutions (CVS) is now one of only four companies in the UK certified through Emerson as a Fisher Approved Service Provider (FASP) for its purpose built control valve workshop facilities in Aberdeen.

The company was audited by Bob Burndred, Emerson's Manager for Fisher Repair Associates Europe and after conducting a thorough audit of the facilities CVS was awarded FASP status. As part of this new status CVS will be able to train its engineers in Cernay, France. This will give CVS access to Fisher/Emerson technology to ensure FM and CSA marks remain valid.

CVS has always been steadfast about client service but now its standards will improve significantly with more access to Fisher spares and historical information to guarantee that repairs are completed to manufacturers' standards.

Bob Burndred said "with CVS we can be very confident that the valves are repaired to our exacting specification and returned to original equipment manufacturer (OEM) standards. This is all part of our commitment to quality for platform operators to improve process efficiency and help sustain the best return on investment in plant."

Mick Beavers Managing Director of CVS responded by saying that "we have worked hard over the last 2 years to gain the confidence of Fisher and Emerson. This puts us in a strong position to work more closely with all of the North Sea operators. I am proud of the team that we have at CVS and this deal means that there is some exciting times ahead as we continue to grow. Having the support of Emerson means that we are able to

demonstrate a broader scope of capabilities to all of our clients. We will be working closely with Fisher to ensure that not only we get good service from them but we become a true support arm for Fisher to serve their existing clients on any issues that may arise with their products."

Mick added "I have been involved with Emerson for a number of years and it was always in my plan to work closely with them although our approval has come much sooner than I expected. As our relationship grows with Fisher I am sure both companies will find the partnership extremely beneficial. We will both be able to give clients the extra service that is desperately needed in an ageing industry where valve reliability is key to safety and production for all operators. We want to deliver to the highest standard of service as possible for the client and continue to expand our capability both onshore and offshore with valve diagnostics and reliability."



In the same month Emerson reviewed CVS for FASP status, the company went through a tough extension audit and surveillance visit from ISOQAR for ISO9001:2008.

The company passed with flying colours and the quality system is fully installed in all areas of the business from valve repair, supply and modification to all its internal systems and procedures. All of CVS' systems are electronic and the companies bespoke internal system CVS Manager was also passed by ISOQAR. The company is taking quality very seriously and has done since it was formed in 2009, with this in mind CVS have applied for further extensions to the quality system and should announce another major certificate within the next six months.



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- **Control Valves:** Members – £195.00, non-members – £295.00 – Wednesday, 5th October
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- **Managing Commercial Risk:** Members – £395.00, non-members – £450.00 – Monday, 10th October
- **PED & ATEX Directives:** Members – £195.00, non-members – £295.00 – Tuesday, 11th October
- **Basic Seals:** Members – £195.00, non-members – £295.00 – Wednesday, 12th October
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May Breaks All Records at Pressure Tech

Forget the British weather. At Derbyshire-based regulator manufacturer Pressure Tech, May has broken all records – for orders!

The eleven year old company's previous best month was as recent as January 2011, but May has not just broken the record, it has blown it apart. Orders for the month of May were 300% of target and propel the company closer to the £1m turnover for the year.

If this trend continues the innovative manufacturer, who has only just moved to larger premises, will be looking to make further investment in people and equipment. Even a recent £150k investment in new CNC machinery may not be enough!



Steve Yorke-Robinson, Managing Director at Pressure Tech

Pressure Tech's order book reveals a healthy diversity too, with major orders from across Europe and the Middle East. Italian distributor FTI Srl have ordered over €30,000 worth of LF-550 high pressure gas regulators, with their Dutch coun-

terparts Maximator securing two projects valued over €100,000. A UK system builder has also placed a very significant order for 66 of the innovative LF-690 hydraulic regulators with ceramic seating, and a major system builder in Dubai placed business for 80 hydraulic 'logic' regulators.

A delighted Pressure Tech Managing Director Steve Yorke-Robinson comments: "Our innovative technology and focus on customer service are really paying dividends. We're also strengthening our relationships with distributors to improve the accessibility of our products for customers. The team within Pressure Tech are really pulling together to service the customers' requirements and I would not be surprised if the record goes again before long."

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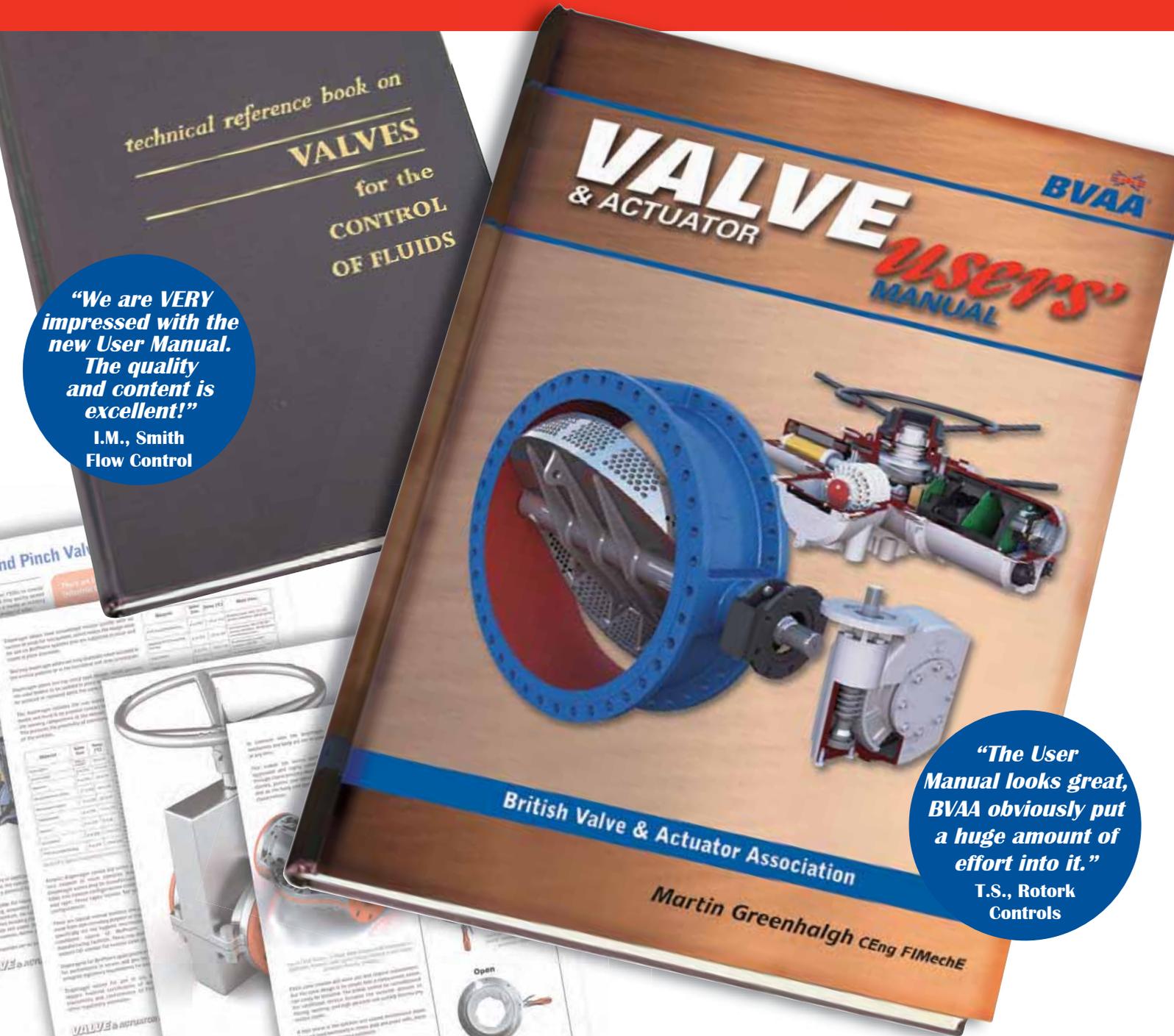


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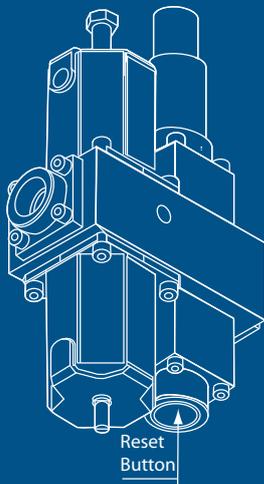
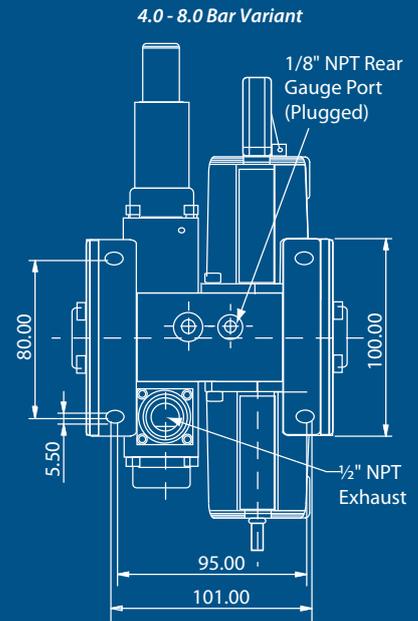


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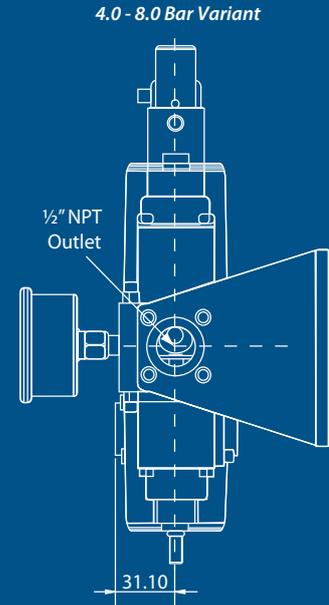
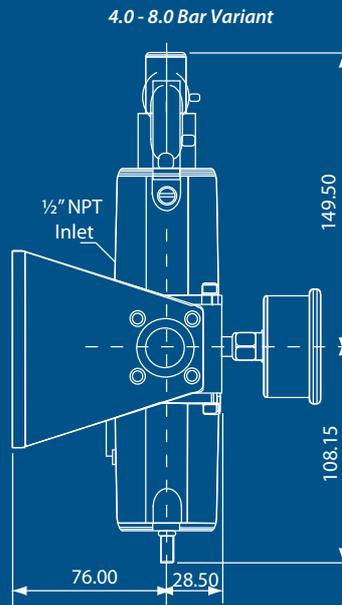


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