James Walker.

Environmental emissions control

How James Walker can help your business

A guide to effective sealing systems from the James Walker Group

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Section 1

James Walker

James Walker is a dynamic global manufacturer and distributor that supplies a vast range of standard and specialised products and services to virtually every industrial sector.

Our world-leading expertise and capability in high performance fluid sealing and bolting technology, led by design and materials technology, embraces the complete industrial cycle from research, development and manufacture, to product application, maintenance and equipment refurbishment. These activities help keep global industry running safely, efficiently and with improved environmental performance, year-in, year-out.

We serve customers in over 100 countries through our extensive production, engineering, distribution, technical support and customer support facilities - backed by IT networks, e-commerce systems and logistics operations.

Quality - the prime consideration

Quality design, quality manufacture and quality service are paramount throughout our worldwide operations. We start with the best raw materials and use advanced manufacturing techniques with strict quality control. This culture is reinforced by top-level technical support, our logistics network and a multitude of customised services.

Our quality standards are third party registered to BS EN ISO 9001:2000. Industry bodies such as API, as well as corporations, utilities and government organisations, regularly assess and approve our standards.

James Walker

Leading with technology

By operating at the leading edge of technology, we ensure that our products and services match the ever-growing complexity of industrial plant - both for today and into the future.

Fluid sealing is not a stand-alone technology: it is based on materials development, innovative design and skilled application. It depends greatly on constant advances in elastomers, engineering plastics, metallurgy and manufacturing techniques, as well as chemistry, tribology and fastener technology.

We make best use of these capabilities to help industry improve its safety, environmental and revenue protection. Many of our products efficiently control fugitive emissions of volatile organic compounds to TA-Luft and other standards. We also provide specialised knowledge and products to companies that must meet the latest environmental legislation, such as the European Union's wide-ranging Integrated Pollution Prevention and Control (IPPC) directive 96/61/EC.

Industry focus

We have top technical specialists dedicated to specific industry sectors where they advise on the application of fluid sealing and associated technologies.

The industries we serve in this way include: chemical and petrochemical, defence and aerospace, engineering and manufacturing, marine, metallurgical, mineral extraction, nuclear, oil and gas, pharmaceutical and food, power generation and supply, renewable energy, rail, semiconductors and electronics, and water and waste.

E-business to meet your objectives

At the heart of our major partnering contracts is an e-procurement system for transacting business by electronic means on a global basis. This fast, flexible service improves supply chain efficiency and reduces stockholding costs for customers. Catalogue content is the key to e-procurement success. We create catalogues in many languages, listing all our products and services needed by the customer. Orders can be tracked, stock levels checked, prices verified, and shipping status and delivery dates confirmed. Supply accuracy and security are unparalleled, and paper trails eliminated.

Your global partner in sealing success

Our role as a global supplier demands an international manufacturing base, plus highly efficient sales and distribution operations. We have a worldwide family of companies with over 50 production, engineering, distribution and customer support sites spread across Europe, Australasia, Asia Pacific, Africa and the Americas.

At the local level, a close-knit network of James Walker companies and official distributors supplies our products and services to well over 100 countries. Our IT systems and logistics operations give customers the surety of supply they need.

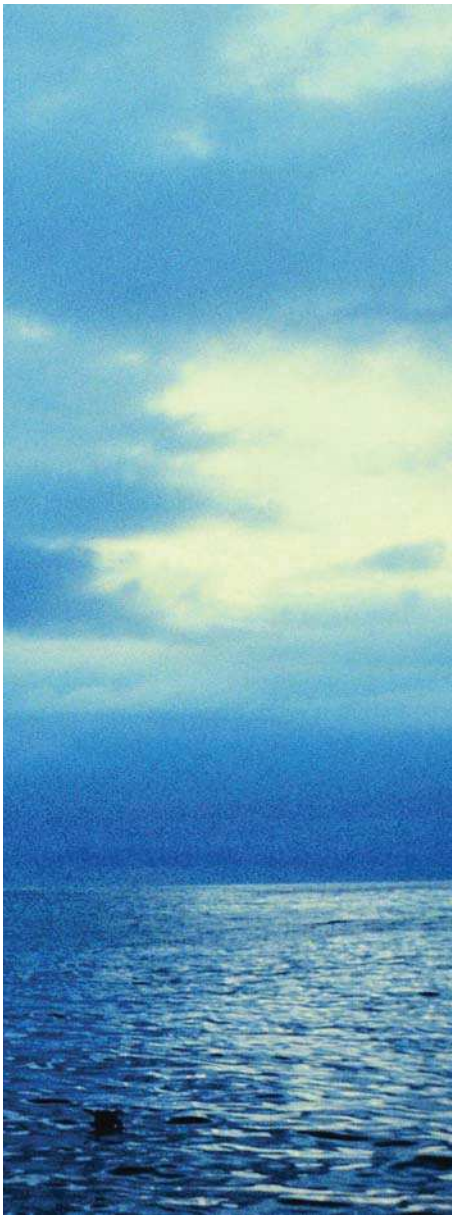
We work in close partnership with customers at all levels. The long-term contracts we forge with multinational corporations cover the requirements of their plants across many continents. Major players in the metallurgical, power generation, chemical and petrochemical processing sectors rely on sole-supply deals with James Walker companies and the technical support we provide.

An overview of the EU Integrated Pollution Prevention and Control (IPPC) regulations

The IPPC Directive 96/61/EC was adopted in the European Union September 1996 and became law in October 1999. This is the first single environmental legislation which takes an integrated approach on emissions including noise, vibration and heat, energy efficiency, water efficiency, waste production, land contamination, emergency preparedness, accident prevention and management systems, in addition to emissions to the environment.

Another innovation is the introduction of the concept of BAT (Best Available Techniques). BAT can apply to either a product or service. Applicants and regulators have to assess what technology is used and how their current systems and procedures impact on environmental protection. Companies will be obliged to use BAT, but to do that, information on new technologies and techniques needs to be established.

James Walker is an active member of the European Sealing Association and we have made a significant contribution to the Association's 'Sealing Technology BAT Guidance Notes'. This document, which is available for free download from the ESA website, gives consensus guidance on Best Available Techniques for sealing; bolted flange connections, rotodynamic equipment, reciprocating shafts and valves. We are certain that the information contained in this document will prove valuable for companies operating outside the EU.



Section 2

How James Walker can help

Introduction

James Walker's great strength is the provision of world-beating solutions to control and eliminate VOC emissions, particularly in refineries, petrochemical, chemical and other areas of the process industries.

VOC is the generic term applied to all compounds containing organic carbon, which evaporate at ambient temperature and contribute to the formation of 'summer smog' and odour nuisance.

As a world leader in sealing solutions, we have an in depth understanding of the latest sealing technologies and products and can confirm whether the sealing systems you have, or are planning to install, meets your emissions containment targets.

We also have a range of highly professional services including plant maintenance and repair and our new Joint Integrity Programme which includes a comprehensive leak detection and repair service for VOCs.

James Walker products

We have an extensive range of world-class products and services which meet or exceed the requirements of many international standards, including the requirements of the German 'TA-Luft'.

In addition to helping ensure effective and efficient emissions control, James Walker products can also significantly reduce energy consumption and costs.

Compression packings for valves

Equipment leaks from valve glands are considered to account for approximately 50-60% of the fugitive emissions on petrochemical sites. Furthermore, the major proportion of fugitive emissions comes from only a small fraction of the sources. For example, less than 5% of valves in gas / vapour service can account for more than 90% of the fugitive emissions in a refinery.

James Walker offers two products - Supagraf® Premier and Supagraf® Control - which were specifically developed through intensive research programmes to combat fugitive VOC emissions from valves.

Supagraf® Premier – world-beating fugitive emission control for block valves

- Fugitive emission control to well below 100ppm
- Certified to TA-Luft requirements
- Low friction on rotary and rising stem valves
- Maximum system pressure: typically 210bar
- Has been testing in a valve in accordance with Shell spec SPE77/312 and achieved class A tightness
- Top of its class in independent tests run on behalf of the CAPI Group (Akzo Nobel, Shell, Dow and DSM)

Supagraf® Control – for control valves – high cycle duty sealing with good fugitive emission control

- High integrity gland sealing for control valves
- Reduces fugitive emissions to below 50ppm
- Certified to TA-Luft requirements
- Long-term, adjustment-free operation - over 100,000 valve strokes
- Low friction graphite for accurate valve action
- Maximum system pressure: typically 210bar
- Has been tested in a control valve to the requirements of ISO 15848-1 and achieved class B tightness levels over 100,000 cycles

Flange Gaskets & Sheet Jointings

A significant majority of VOC fugitive emissions come from petrochemical process equipment. In addition to a wide range of quality sheet gasket materials such as compressed fibre and expanded graphite, James Walker also offers four world-beating solutions - Metakamm® Kammprofile, Metaflex® spiral wound gaskets, Metcom® and a range of WL Gore & Associates PTFE gasket products. A range of sheet jointing materials, including expanded graphite, is also available.

Metakamm® Kammprofile

Our Metakamm® Kammprofile gaskets are now widely specified for high temperature/pressure pipework, heat exchangers and other pressure vessels where spiral wound gaskets were previously used. The structure involves a robust metal core with a soft layer of sealing material bonded to concentric grooves on either side. These are easier to handle at large diameters, whereas rough handling can often cause a large diameter spiral-wound gasket to spring apart.

Prime features

- Accommodate a vast range of operating conditions including line temperatures up to 1000°C and pressures typically up to around 250bar
- Used on vessels such as heat exchangers where thermal cycling exists, and where joints need to be made quite rigid for best results
- Undamaged cores can often be fitted with new soft faces to reduce maintenance costs
- Certified as meeting TA-Luft emission control requirements
- Manufactured to suit all relevant flange standards including ASME B16.5, BS1560, ASME B16.47 Series A (MSS-SP44), ASME B16.47 Series B (API605), BS EN 1092 (BS4504); plus DIN, JIS and NF

Metaflex®

Typically Metaflex® spiral wound gaskets are used on pipelines and pressure vessels on steam, petrochemical, nuclear, marine and hydraulic plant, and heat exchangers.

Metaflex® gaskets are manufactured from V-shaped metal strips, spirally wound with an inlay of filler between each turn. Support rings, inside and/or outside the spiral, improve the gasket's handling, fitting and versatility. This arrangement is highly successful on flanges where temperature, pressure, vibration or flow rates are beyond the capability of conventional jointing materials.

Prime features

- A wide variety of sizes and shapes
- Combinations of metal strip and filler are selected to suit the specific fluid media and operating conditions
- Quick to install and remove

- Operating temperatures from cryogenic up to 1000°C
- Ability to cope with thermal cycling conditions
- System pressures from high vacuum to over 350bar
- Support rings - inside and/or outside the spiral - make gaskets suitable for high pipeline pressures on flat or raised flange faces
- Certified as meeting TA-Luft emission control requirements
- Manufactured in accordance with all relevant gasket standards to suit flange designations: ASME B16.5, BS1560, ASME B16.47 Series A (MSS-SP44), ASME B16.47 Series B (API605), BS EN 1092 (BS4504); plus DIN, JIS and NF

Metcom® gaskets

Self-locating Metcom® gaskets are suitable for high temperatures and pressure applications, and are particularly effective when used to replace thinner pipe joints used in petrochemicals liquid or gas production and transportation.

Prime features

- Thin corrugated steel with concentric grooves
- Grooves filled with expanded graphite
- Lug design for easy fitting with self-location. The multi-fit lug design means a reduced inventory as one size fits several flange classes
- Thinner than a spiral wound gasket, when replacing compressed fibre gaskets used previously
- Certified to TA-Luft requirements

GORE® Universal Pipe Gaskets

GORE® Universal Pipe Gaskets (Style 800) are used to seal all types of flanges in chemical process piping. Designed to meet the needs of many different piping materials, they are ideal for standardising gasket material across the steel, glass-lined steel and FRP systems, whenever a non-metallic gasket can be used. GORE® Universal Pipe Gaskets meet TA-Luft requirements.

Other Jointing Materials

In addition to its range of gaskets, James Walker offers a complete range of sheet jointing materials, including expanded graphite.

Bolted Joints

Ensuring minimum leak risk

Conventional bolt tightening methods often leave a lot to be desired. Relying on torque means that the relationship between tightening power and achieved tension in the fastener has to be estimated, as the frictional properties on the threads and washers cannot be guaranteed.

Similarly, devices such as hydraulic tensioners use an estimated degree of overload to try and compensate for compliance in the system when these tensioners are de-pressurised.

The only way to ensure minimum leak risk is to install joints to the optimum loading. To achieve this, you need a way of actually measuring the installed fastener tension load with some degree of accuracy. Tension control is critical to the reliability and safety of bolted joints.

Traditional tightening methods measure the secondary factors of torque or hydraulic pressure - they do not measure the key factor- tension! RotaBolt® delivers tension control at installation and throughout the life of the bolted joint, providing simple, accurate and continuous verification of pressure on the gasket

RotaBolt® tension control fasteners

The James Walker RotaBolt range of tension monitoring systems and unrivalled technical expertise has established the company as a global centre of excellence for bolting technology. We provide solutions across a wide range of industries including oil and gas, chemical processing, power generation, civil engineering, environment, transport and defence.

Incorporating RotaBolt® technology into product design delivers significant benefits from health & safety and environmental perspectives. The accuracy of gasket pressure control made possible by RotaBolt technology has been shown again and again to deliver cost savings through reduced maintenance and down time. The installation of gaskets combined with RotaBolts is now playing an important role in maintaining operational reliability across a vast range of industries.

RotaBolt® 1

The RotaBolt® tension sensor design has been proven in the most arduous of applications for over 25 years. Every RotaBolt is 100% load test calibrated to an accuracy of 5% on tension. Standard bolts are converted by inserting the RotaBolt indicator. Component materials are compatible with the parent bolt to nullify in-service thermal and galvanic effects.

Before bolt installation, the special rotacap spins freely. As the bolt is tightened, it stretches elastically and the rotacap locks at the specified calibrated tension value. If tension reduces for any reason, the rotacap immediately rotates freely to give a clear indication of tension loss.

RotaBolt® 2

RotaBolt® 2 provides an additional tension control on installation tightening and in-service checking, by offering two tension settings in a single sensor. A dual load indicator cap - the outer cap for high-tension setting and the inner cap for low tension - gives the choice of an operational tension range, either for overload or maintenance control.

RotaBolt® Vision

RotaBolt® Vision is the world's first safety bolt to give a clear, visual indication of loss of tension across the bolted joint. It operates on the same internal air-gap sensor technology as RotaBolt® 1, but instead of a tactile, fingertip indicator, RotaBolt Vision has a specially developed visual indicator which appears as an unbroken yellow line across the head of the bolt.

As soon as tension is lost across the bolt, the indicator instantly rotates by ninety degrees to show a distinct right angle break in the yellow line. This is clearly visible up to 25 metres away.

Supagraf® Tanged T10

Description
Sheet jointing of 98% pure exfoliated graphite reinforced with a central layer of 0.1mm thick tanged stainless steel. The graphite is compressed onto the perforated metal sheet to give a secure mechanical lock without adhesive.

Prime Features
- Exceptional resistance to blow-out and crushing
- Extra strength for ease of handling and fitting
- Anti-stick coating available

Specification
BAM-approved for use with liquid and gaseous oxygen in flange connections of copper, copper alloys or steel at operating conditions up to 130bar and 200°C.

Service Capability
For applications falling into the green zone, the product may normally be used without consultation. In the amber zone, we recommend that our technical services team is contacted for confirmation of suitability. If the pressure/temperature combination is in the red zone then we must be consulted before the product is used. Class lines refer to ASME B16.5. For inert/reducing media the maximum temperature is 700°C, but ensure that temperatures above 400°C on atmosphere side of flange do not cause gasket to oxidise inwards from the outside edge. Minimum operating temperature is -200°C.

Supagraf® Laminated N7

Description
Sheet jointing of 98% pure exfoliated graphite with a bonded central layer of nickel foil.

Prime Features
- Extra strength for ease of handling and fitting
- Excellent sealing integrity
- Can be cut with hand tools

Physical properties
Typical values for 1.5mm thick sheet
- Density (graphite): 0.7 mg/m3
- Compressibility: 45% (ASTM F36A)
- Recovery: 17% (ASTM F36A)

Service Capability
- Maximum temperature (oxidising media): 400°C
- Maximum temperature (*inert/reducing media): 1000°C

(*Ensure that temperatures above 400°C on atmosphere side of the flange do not cause the gasket to oxidise inwards from the outside edge.)

Fluolion® Integra Blue

Description
General purpose PTFE-based sheet jointing specially stabilised and mechanically treated to improve multi-directional strength, combat creep and improve resilience for flange jointing duties.

Typical Applications
Flanged joints on plant that handles aggressive fluid media, especially where hygiene is top priority - such as in the pharmaceutical, food and electronic industries. It is especially suited to applications with weak or lightly loaded flanges, as well as standard flange duties.

Prime Features
Highly recommended for duties with caustic alkalis and strong acids, at elevated temperatures and moderate concentrations. High compressibility for effective sealing on lightly loaded flanges. Outstanding resistance to a very wide range of chemical media. Inherently clean, non-toxic and non-tainting. Can be used at cryogenic temperatures.

Specifications
Complies with requirements of FDA Regulations for food use. WRAS-approved for use with hot and cold potable water up to 85°C.

Fluolion® Integra White

Description
Specially stabilised PTFE sheet material, mechanically treated to improve multi-directional strength, combat creep and improve resilience for flange jointing. It was previously designated Fluolion® Integra.

Typical Applications
Flanged joints on plant that handles extremely aggressive fluid media. Also where hygiene is top priority - such as in the pharmaceutical, food and electronic industries.

Prime Features
Highly recommended for duties with strong acids and oxidising agents at elevated temperatures and all concentrations. Outstanding resistance to a very wide range of chemical media. Inherently clean, non-toxic and non-tainting. Can be used at cryogenic temperatures. Displays compressibility and recovery characteristics close to those of many non-asbestos fibre jointings.

Specifications
Complies with requirements of FDA regulations for food use, and USP 25, Class V classification of plastics for pharmaceutical service. WRAS-approved for use with hot and cold potable water up to 85°C.

Gasket cutting service

Immediate supply
James Walker is dedicated to meeting industry's immediate demands for precision-cut gaskets from sheet jointing materials, as well as for spiral wound and metallic types.

Our automated distribution centres hold ten million sealing products ready for same day dispatch throughout the world. A vast number of these stock items are gaskets to suit flanges across all sectors of industry.

If we do not have your gaskets in stock, we can usually manufacture them economically within minutes.

For this we use highly accurate CAD/CAM controlled water-jet cutters, ready programmed with every gasket design to national and international standards. We hold large stocks of non-asbestos sheet jointings, rubber and Supagraf® products in all standard thicknesses, specifically for this purpose.

Custom-cut gaskets

Using the same technology enables us to make any shape, size and quantity of non-standard cut gaskets to high precision standards - and meet seemingly impossible deadlines.

We work directly from customers' CAD/CAM files, sent on disk, CD or e-mail. In addition, we can digitise profiles from drawings, samples or templates - no tooling is needed.

Our state-of-the-art water-jet cutters operate with all major CAD languages. Nesting pattern software, combined with video acquisition equipment to capture the shape of a sheet, ensure the maximum number of gaskets is produced with minimum wastage.

These systems prove highly economical for prototype cutting as well as large batch runs.

For metallic materials, such as Supagraf® Tanged Jointing T10, we use an abrasive water-jet cutter. This slices intricate designs from the toughest materials - including alloy steels and titanium - leaving a perfectly clean edge without heat distortion. Each hair thin water jet is loaded with crushed garnet and operates at Mach 2 and 4000bar.

Noise limiting products

James Walker Group company, Tiflex, offers a range of impact and airborne attenuation products. These include Acoustic Barrier, a range of acoustic underflooring designed to suit applications in new and refurbishment projects, Trackelast Attenuate (@~10~u~8) which deadens rail noise and vibration by up to 6dB and the TICO range of products which includes anti-vibration materials for machinery and construction applications.

Support Services

Joint Integrity Programme

The James Walker Joint Integrity Programme has been developed to support asset managers by offering an integrated and engineered approach to the provision of advanced sealing solutions.

Old equipment is updated or replaced and new equipment added to keep pace with changing market conditions and the demands of environmental legislation.

Frequently, the result is a tangle of pipe-work and equipment from different manufacturers – and even different eras - bolted together. For an asset manager, ensuring all of these bolted joints remain intact and leak-free can be a nightmare.

Bolted joints are sometimes a low priority when it comes to maintenance planning. The focus of most maintenance schedules is on the large – and expensive - equipment on site. It is only when there is a failure and expensive product is pouring down the drain that the value of joint integrity is really appreciated.

The purpose of our Joint Integrity Programme is to re-align that focus, by drawing on the combined expertise of all the companies within the James Walker Group, from bolting through to gasketing and project management.

To support the programme, we have entered into a series of strategic alliances which will provide specific benefits to our clients.

The Joint Integrity Programme approach - **Evaluate, Design** and **Apply** - is aimed at delivering long-term solutions where the cost benefits speak for themselves, as opposed to short-term fixes that need to applied again and again, at considerable cost.

We recognise that no one solution will be applicable to everyone. The Joint Integrity Programme is made up of a series of modules that can be tailored to suit each individual client's needs and requirements. Some of these modules are outlined below.

- Leak Detection and Repair (LDAR) for vessels handling volatile organic compounds
- Tagging, data management and reporting
- Heat exchanger and pressure vessel bolted joint programme

Clients can choose a single service or a combination of services to best meet their needs.

LDAR (Leak Detection and Repair)

Our LDAR service combats fugitive VOC emissions at oil, gas and chemical sites. We monitor all piping components, flange joints and valves to EPA Method 21, then record and track VOC emissions. We can assist in scheduling repairs and carry out maintenance or refurbishment work. We then undertake regular site audits to ensure the lowest possible emission levels.

There are many additional benefits associated with our LDAR programme. For example, LDAR assists with environmental reporting and also interfaces with your general maintenance activities.

LDAR will:

- Reduce your operating costs
- Stem your loss of valuable products
- Improve your environmental performance
- Enhance the safety of your on-site operatives

Data management and reporting

A crucial part of the James Walker service is the collection of data from the client's site which can then be used to produce reports which support their emission control or general business plans.

Heat exchangers and pressure vessels

Heat exchangers and pressure vessels carry a high risk of VOC leaks. We will evaluate, report, and provide an engineered solution, which can include analysis, on-site measurement, machining, dismantling, the installation of products and components and ongoing, on-site support. By choosing a tailored solution, you increase production levels, reduce downtime and cut maintenance costs.

Plant maintenance & refurbishment

James Walker companies also supply industry worldwide with professional plant maintenance and refurbishment services that go well beyond the accepted norms in terms of advice and planning, the quality of on-site and off-site workmanship and the standards of safety and care.

Our on-site maintenance capabilities include the overhaul of plant, such as pumps, valves, mixers, hydraulic equipment and flange joints, together with the replacement of expansion joints and bellows.

We refurbish any model of industrial valve, pump, hydraulic cylinder or mechanical seal at our dedicated workshops. Another James Walker speciality is the overall re-engineering of sealing systems, where we provide metalwork conversions for rotary equipment to facilitate improvements and accommodate new seal designs.

In conclusion

James Walker has the products, expertise and integrated sealing solutions to save you time and money when planning and implementing your emission control plans.

James Walker products and services can help cut equipment leaks dramatically and achieve efficiencies through reduced power consumption, better use of energy, improved water usage and better plant performance.

James Walker repair and maintenance services can ensure your emissions control targets are maintained and that your plant operates in the most effective and efficient way.

In essence, the James Walker mission is to prevent pollution of the environment through a range of products and services which are environmentally friendly and which generate major benefits for your business.

Typical scenario

On more than one occasion, James Walker has been presented with a leaking pressure vessel in hydrocarbon service, where there has been a risk of fire due to the escape of hot VOC products. In such cases a 'steam quench' is used to surround the flange to flush the vapours out of the atmosphere to try and mitigate the obvious risks. By using good bolted joint technology, quality gaskets and accurate loading with RotaBolts, these joints have remained leak-free, giving the following advantages:

- Reduced VOC product losses, hence reduced lost product cost and improved environmental performance
- Reduced water consumption by reducing the need for the steam quench
- Reduced power consumption and costs by removing the need to generate steam for the steam quench
- A safer working environment for the plant operators
- Removal of the need to apply short-term, costly, repetitive maintenance work

Case study

Engineers at a large urea plant in New Zealand had struggled to curb leakage from a flange for no less than 10 years before our local operation finally solved the problem. The particular joint was the dome flange on a high pressure decomposer reboiler lid. Despite the engineers' best efforts, this flange leaked continuously, even after shutdowns when the joint had not been broken.

The hazardous nature of the product - urea carbamate solution at 185°C - eliminated any prospect of re-tensioning the bolts while the plant was operational. After discussions with the site engineers, our gasket experts checked the flange gasket calculations and devised a solution - a PTFE-faced Metakamm® gasket from the James Walker Moorflex range, combined with 36 RotaBolt-controlled tension studs.

After these had been installed and correctly tensioned, the joint was monitored. It was discovered that the gasket relaxed after 12 hours at ambient temperature; something the plant engineers hadn't previously taken into account. Spotting this change in joint integrity was made simple by the RotaBolts which immediately reacted to the altered tension.

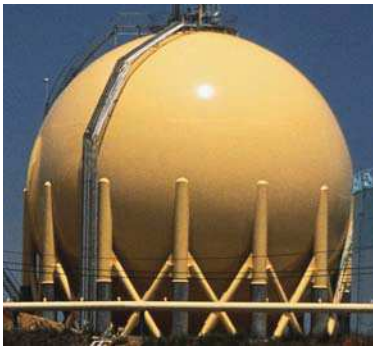
It was then only a matter of re-tensioning each RotaBolt® to solve, in a matter of hours, a problem that had baffled engineers for a decade. Since the new joint was made, the previously troublesome vessel has been opened up no less than four times for cleaning, with no signs of leakage when the process has been re-started.

Information

This booklet is given for information purposes only. While we have taken every care to ensure that the information contained in this booklet is accurate and up to date, you should always obtain specific and expert advice before taking or refraining from taking any action. We will not accept any liability whatsoever for any losses, damage or injury whether financial or otherwise which any person may suffer as the result of acting or refraining from acting solely on the basis of the information contained in this booklet.

Health warning: If PTFE or fluorocarbon (FKM) products are heated to elevated temperatures, fumes will be produced which may give unpleasant effects, if inhaled. While some fumes are emitted below 250°C from fluorocarbons or below 300°C from PTFE, the effect at these temperatures is negligible. Care should be taken to avoid contaminating tobacco with particles of fluorocarbon or PTFE or with PTFE dispersion, which may remain on hands or clothing. Material Safety Data Sheets (MSDS) are available on request.

Information in this publication and otherwise supplied to users is based on our general experience and is given in good faith, but because of factors which are outside our knowledge and control and effect the use of products, no warranty is given or is to be implied with respect to such information. Specifications are subject to change without notice. Statements of operating limits quoted in this publication are not an indication that these values can be applied simultaneously



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