

James Walker®

Sealing Guide for Conventional Thermal Power Generation

Global supply of

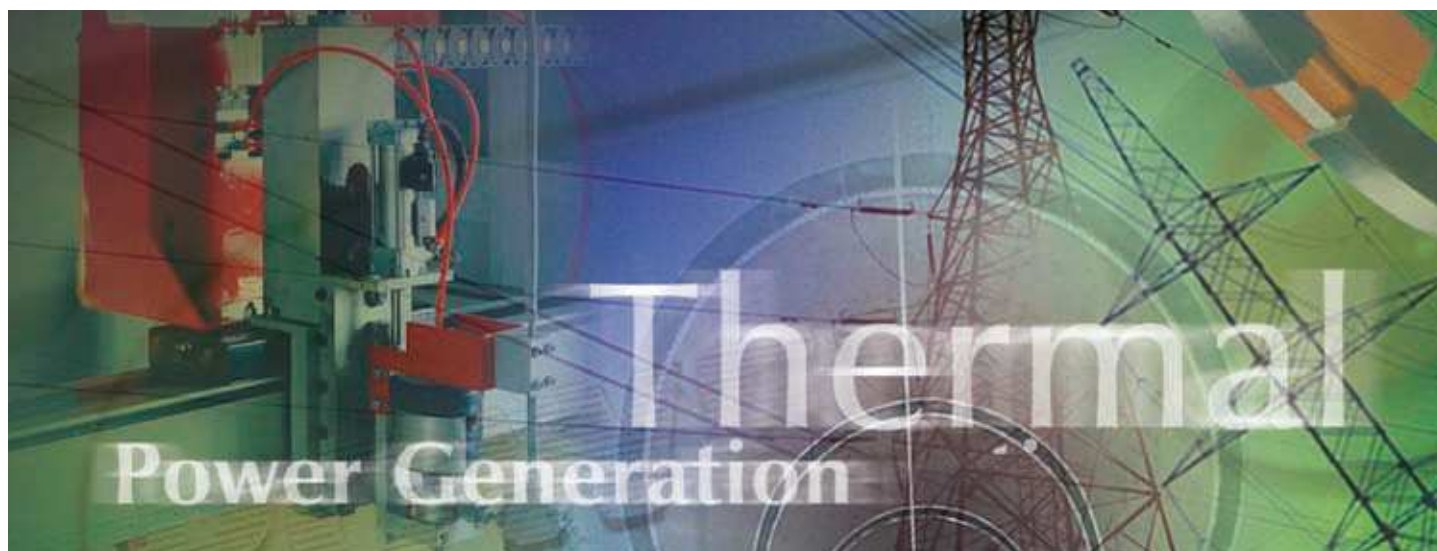
- *Best-value fluid seals & gaskets*
- *Standard & custom-designed products*
- *Expansion joints & bellows*
- *Bolting technology*
- *Vibration damping & control*



High Performance Sealing Technology



Sealing guide for conventional thermal power generation



Introduction

James Walker is a dynamic global manufacturer and distributor that supplies a vast range of specialised products to the power generation industry on a global basis.

From fuel handling and preparation plant, through combustion systems, high pressure steam raising, to exhaust processing, and heavy electrical plant — we have a long-proven track record as a leader in fluid sealing and associated technologies.

Our world-leading expertise and capabilities are led by design and materials technology, plus the willingness to solve sealing problems for equipment manufacturers, plant operators and maintenance contractors.

To achieve this, we embrace the complete industrial cycle from research, development and manufacture, to product application and plant maintenance.

This publication covers coal, gas, oil, and waste-fired plant, as well as CCGT. It follows a route through the power generation process and itemises the James Walker products and services applicable to different plant.

As well as supplying well over quarter of a million standard products, we also specialise in the custom design, prototyping, testing and manufacture of sealing products and systems to solve specific problems.

In addition, we formulate and compound special high-performance elastomers, and undertake the custom moulding and extrusion of rubber components of all sizes and complexities for industrial applications.

A separate sealing guide covers the Hydropower Industry (see page 15), and a version covering Nuclear Power generation is currently under preparation.

Our range is being constantly developed to meet the changes and increased demands of the power industry, so please contact your local James Walker company — as shown on rear cover — if your need falls outside the products and services described.

Contents

Page	
3	Meeting global demands
4	Quality led by technology
5-6	Fuel handling & preparation
7	Fuel combustion systems
8-9	Boiler systems
10	Cooling systems
11-12	Exhaust processing
13	Turbine & Generators
14	Electrical plant
15	Technical guides
	Trademark acknowledgement
	General information
16	Worldwide contacts

Meeting global demands



Global services

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 products and services to well over 100 countries. Our highly developed IT-networks, e-commerce systems and logistics operations give customers the surety of supply they need.



Partnering contracts

E-commerce and logistics feature strongly in our long-term partnering contracts with major national and multi-national corporations. Their engineers are able to specify, select and order sealing items on line from site, anywhere in the world, in the sure knowledge that their requirements will be swiftly and efficiently met.

These contracts are managed by dedicated managers, backed by specialised teams of experts, whose sole responsibility is to service the needs of that customer's sites across different countries and continents. In many cases we hold stocks of customer-specific products local to their sites for immediate delivery.

Our service, however, is not limited to the supply of items to meet planned maintenance and unscheduled shutdowns.

Our power generation industry specialists work in close harmony with customers' engineers and scientists to solve their complex fluid sealing problems and generate best-value solutions. This leads to the development of new products that meet ever-increasing demands, changing health and safety regimes and new environment legislation.

Quality led by technology



Quality — our 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 of every process.

This culture is reinforced by top-level technical support, logistics operations and a multitude of customised services.

Our quality standards are third party registered to BS EN ISO 2001:2000. Industry bodies, as well as corporations, utilities and government organisations, regularly assess and approve our standards.

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 systems 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.

Scientists and engineers at the James Walker Technology Centre work constantly on in-house and customer-specific research and development projects — often in conjunction with other sites of excellence — to convert innovative materials and ideas into sealing production reality.

These are just a few examples of our R&D successes:

- **Walkersele® OSJ-2** — OSJ® is our patented technique for On-Site Joining a seal around a shaft without stripping down the housing or shaft. This saves plant operators days of maintenance time and plant shutdown, without loss of sealing integrity or operational life.
- **Walkersele® Ultraglide** — A reformulated hydrogenated nitrile (HNBR) material with optimised properties that greatly extend the working life of rotary seals running for long periods under hot and abrasive conditions. Under such arduous conditions, Walkersele® Ultraglide has given six times the maintenance-free life of a traditional nitrile (NBR) seal.
- **RotaBolt®** — The world's first safety bolt to give a clear indication of tension loss across a bolted joint. It uniquely improves safety regimes and makes significant savings in maintenance costs.

Fuel handling & preparation

Sealing products that improve plant performance at the fuel handling end of the power generation process

Hydraulic compactors

Waste fired plant

- **Hydraulic rams:** A full family of hydraulic sealing products that includes Chevron®, Solosele®, support rings and scraper rings — in a range of high performance elastomeric and plastic materials. Comprehensive range of 'O' rings and back-up rings. Comflex® rod protector bellows, custom designed to suit most situations.
- **Control valves:** Low friction preformed packing sets in Supagraf® materials.
- **General:** Cut gaskets in Centurion®, reinforced Supagraf®, and a range of elastomeric jointing materials, plus a full range of metallic gaskets. RotaBolt® tension control fasteners for secure and reliable mounting.

Conveyor systems

Coal & waste fired plant

- **Belt scrapers & side skirts:** Polyurethane/rubber water-jet cut profiles.
- **Drive motors:** Coupling drive rubbers, and drive disks.
- **Gearboxes:** Walkersele® OSJ-2 radial lip seals. A full range of cut gaskets and metallic gaskets.
- **Rollers:** Support rollers and roller refurbishment.
- **General:** Rubber-to-metal bonding. Tico® S mounting pads.

Cooling water filter screens & gates

Coal fired plant

- **Gate seals:** Elastomeric extrusions, fabrications and mouldings.
- **Hydraulic actuators & rams:** A full family of hydraulic sealing products that includes Chevron®, Solosele®, support rings and scraper rings — in a range of high performance elastomeric and plastic materials. Comprehensive range of 'O' rings and back-up rings. Comflex® rod protector bellows, custom designed to suit most situations.
- **Control valves:** Low friction preformed packing sets in a range of Supagraf® materials.
- **Pipework flanges:** Cut gaskets in Sentinel®, Centurion®, reinforced Supagraf® and a range of elastomeric jointing materials.
- **Valve actuators:** Full family of hydraulic sealing products, together with low friction preformed packing sets.



Precision cut gaskets in Supagraf® Tanged T10 stainless steel reinforced graphite jointing

Supagraf® Control packing sets for smooth action with control valves



RotaBolt® tension control fasteners



Hydraulic sealing products



Comflex® protector bellows



Tico® S mounting pads



Fuel handling & preparation — continued

More sealing and associated products that improve plant performance at the fuel handling end of power generation

Fuel storage tanks & delivery systems

Oil & coal fired plant

- **Pipelines:** Cut gaskets in reinforced Supagraf®, Nebar® bonded cork, and a range of elastomeric jointing materials.
- **Mechanical seals:** Sealing units and refurbishment services.
- **Pumps & valves:** Cut gaskets in Centurion®, Nebar®, reinforced Supagraf®, and a range of elastomeric jointing materials. Metallic gaskets that include Metaflex® spiral wound and Metakamm® Kammprofile types. Wide range of compression packings that includes length form, plus preformed and die-pressed rings.

Pulverised fuel (PF) mills

Coal fired plant

- **Hydraulic cylinders:** A full family of hydraulic sealing products. Comflex® protector bellows.
- **Mill doors:** Door seals and gaskets of all types, including reinforced Supagraf® gaskets, preformed Supagraf® Boilermaster gaskets, and a range of glass ropes and tapes.
- **Mill ducting:** Comflex® expansion joints (dependant on country, an on-site evaluation service using thermal imaging is available, coupled with on-site installation capability).
- **Mill gearboxes:** Walkersele® OSJ-2 radial lip seals. Cut gaskets in Centurion® and Supagraf® jointing materials.
- **Rotary seals:** Walkersele® OSJ-2 radial lip seals.
- **PF & PFA pipework:** Cut flange gaskets in Centurion® and reinforced Supagraf® jointings, plus preformed Supagraf® Boilermaster gaskets. Comflex® expansion joints (dependant on country, an on-site evaluation service using thermal imaging is available, coupled with on-site installation capability).
- **Holding bolts:** RotaBolt® tension control fasteners.

Hoppers & chutes

Coal & waste fired plant

- **Expansion joints:** Comflex® expansion joints (dependant on country, an on-site evaluation service using thermal imaging is available, coupled with on-site installation capability).
- **Hopper liners:** Low-friction liners in high molecular weight polyethylene.



Walkersele® OSJ-2 radial lip seal with James Walker's patented On-Site Joining technique

Supagraf® Boilermaster preformed gaskets of braided carbon ribbon



Gaskets in Nebar® bonded cork



Metaflex® spiral wound gaskets



Precision cut gaskets in high performance sheet jointing



Metakamm® Kammprofile-type gaskets



Fuel combustion systems

Well proven sealing products that work reliably at high temperatures and in aggressive environments

Rotary air heaters

Coal fired plant

- **Hood seals (cold end):** Comflex® expansion joints with PTFE membrane.
- **Hood seals (hot end):** Expansion joints in Super Twilstele® XA/G high-temperature resistant material.
- **On-site services:** Dependant on country, an on-site evaluation service for expansion joints using thermal imaging is available, coupled with installation capability.



Comflex® expansion joints with PTFE membrane

Air heater soot blowers

Coal fired plant

- **Lances:** Cut gaskets in reinforced Supagraf® jointing materials, plus a full range of metallic gaskets.



Supagraf® Tanged T10 containing thin central layer of tanged stainless steel

Burners

Coal, gas, oil & waste fired plant

- **General:** Cut gaskets in reinforced Supagraf® jointing materials, plus Metaflex® spiral wound and other metallic gaskets. 'O' rings of Kalrez® perfluoroelastomer from DuPont Performance Elastomers.



Metaflex® spiral wound gaskets

Fans & hot air ducting

CCGT, plus coal, gas, oil & waste fired plant.

- **Damper seals:** P-section/tadpole seals.
- **Hydraulic actuators:** A full family of hydraulic sealing products that includes Chevron®, Solosele®, support rings and scraper rings — in a range of high performance materials. Comprehensive range of 'O' rings and back-up rings.
- **Gaskets:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials, along with preformed Supagraf® Boilermaster gaskets, plus length form glass tapes and ropes.
- **Duct expansion joints:** Comflex® expansion joints (dependant on country, an on-site evaluation service using thermal imaging is available, coupled with on-site installation capability).
- **Rotary seals (coal fired plant):** Walkersele® OSJ-2 rotary lip seals that negate the necessity to dismantle plant when fitting.



Kalrez® 'O' rings



Chevron® hydraulic seals

Wind box

Coal fired plant

- **Internal bellows:** Comflex® bellows (dependant on country, an on-site evaluation service using thermal imaging is available, coupled with on-site installation capability).



Comflex® HT/XA expansion joints

Boiler systems

Gaskets, compression packings and other sealing products for high pressure steam-raising and associated systems

Boiler ash hoppers

Coal fired plant

- **Expansion joints:** Comflex® expansion joints and flexible chutes (dependant on country, an on-site evaluation service for expansion joints, using thermal imaging, is available, coupled with on-site installation capability).

Boiler control valves

CCGT, plus coal, gas, oil & waste fired plant

- **Bridgman-type valves:** Replacement seating rings of stainless steel reinforced Supagraf® moulded graphite. These are cost effective, easy to fit, and replace the existing soft iron rings that can be extremely difficult to remove.
- **Valve actuators:** Comflex® protector bellows.
- **Valve & pipe flanges:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials, plus Metaflex® spiral wound and other metallic gaskets — please refer to our *Gaskets & Jointings* guide (see page 15).
- **Valve stems (steam & hot water duties):** Supagraf® RibbonPak M compression packing in length form and preformed sets, plus die-pressed Supagraf® Moulded Rings.
- **Valve stems (non-steam/hot water duties):** Wide range of other high efficiency compression packings — please refer to our *Compression Packings* guide (see page 15).
- **Live loading:** Calibrated live loading systems for valve stem packings.
- **Valve bonnets:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials, plus Metaflex® spiral wound and other metallic gaskets.

Boiler dead space

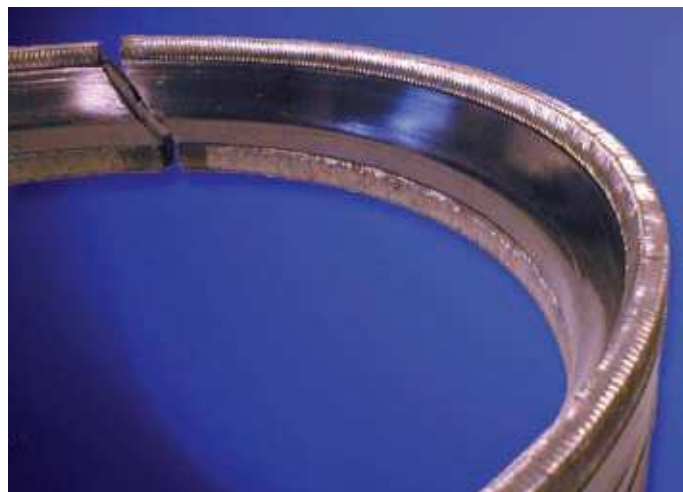
Coal, gas & oil fired plant

- **Sidewalls:** Comflex® sidewall seals.
- **Sling rods:** Comflex® sling rod penetration seals.

Boiler door/access apertures

CCGT, plus coal, gas, oil & waste fired plant

- **Gaskets:** In reinforced Supagraf® materials, plus Metaflex® spiral wound and other metallic types.
- **Gasket tapes & ropes:** Supplied in glass and other special high temperature material grades.



Reinforced Supagraf® seating ring for Bridgman-type valves



Supagraf® RibbonPak M



Comflex® protector bellows



Supagraf® Moulded Rings



High-temperature braided and woven products

Boiler systems — continued

More products developed for long-term sealing integrity with high temperature, high pressure steam

Boiler feed pumps

Coal, gas & oil fired plant

- **Gaskets:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials, plus Metaflex® spiral wound and other metallic gaskets.
- **Seals:** Mechanical seals. Fortuna XA length form packings and packing sets.

Boiler soot blowers

Coal, oil & waste fired plant

- **Soot blower lances:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials, plus Metaflex® spiral wound gaskets.
- **Lance packing sets:** Several types of packing set can be manufactured, dependant on lance type. These include silicon-proofed fabric mouldings, preformed packing rings and variable density die-pressed Supagraf® rings.

Boiler pipework

CCGT, plus coal, gas, oil & waste fired plant

- **Gaskets:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials, plus Metaflex® spiral wound and other metallic gaskets.
- **Flange bolting:** RotaBolt® tension control fasteners.

Bridgman-type valves

CCGT, plus coal fired plant

- **Seating rings:** Replacement seating rings of stainless steel reinforced Supagraf® moulded graphite. These are cost effective, easy to fit, and replace the existing soft iron rings that can be extremely difficult to remove.



Metaflex® spiral wound gaskets



Mechanical seals



Fortuna XA packing for high speeds and high temperatures



Gaskets in Supagraf® Laminated S10 jointing reinforced with stainless steel foil



RotaBolt® tension control fasteners

Cooling systems

Cartridge sealing arrangements for the largest cooling water pumps, down to small hydraulic seals for valve actuators

Condensers

CCGT, plus coal, gas, oil & waste fired plant

- **Door seals:** Water-jet cut profiles in all types of jointing material.
- **Gaskets:** Cut gaskets in Centurion®, reinforced Supagraf® and EPDM jointing materials, plus Metaflex® spiral wound and other metallic types.
- **Tubes:** Tube plugs and tube test seals.
- **Valve actuators:** Comflex® protector bellows.
- **Valve stems:** Supagraf® RibbonPak M compression packing in length form or preformed rings and sets.
- **Bolted joints:** RotaBolt® tension control fasteners.

Cooling water (CW) pumps

CCGT, plus coal, gas, oil & waste fired plant

- **Rotary seals:** Special sealing systems based on HydroSele® cartridge units — which can include condition monitoring and telemetry support systems.
- **Gaskets:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials, plus Metaflex® spiral wound and other metallic types.
- **Pump glands:** Liongraf, Fluograf®, Hornet and Supagraf® RibbonPak length-form packings and preformed packing sets.

General valves on cooling systems

CCGT, plus coal, gas, oil & waste fired plant

- **Gaskets:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials plus Metaflex® spiral wound and other metallic types.
- **Valve stems:** Supagraf® RibbonPak M packing in length-form and preformed sets.

General pumps on cooling systems

CCGT, plus coal, gas, oil & waste fired plant

- **Drive motors:** Coupling drive rubbers, and drive disks.
- **Gaskets:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials plus Metaflex® spiral wound and other metallic types.
- **Pump glands:** Liongraf, Fluograf®, Hornet and Fluolion® Emulsion 2XA compression packings.

HP & LP feedwater heaters

CCGT, plus coal, oil & waste fired plant

- **Bursting discs:** Water-jet cut profiles.
- **Gaskets:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials plus Metaflex® spiral wound and other metallic types.
- **Bolted joints:** RotaBolt® tension control fasteners.



HydroSele® — innovative cartridge unit for high-flow water systems.

Pipework on cooling systems

CCGT, plus coal, gas, oil & waste fired plant

- **Bellows:** Comflex® reinforced single-convolution high pressure rubber bellows.
- **Gaskets:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials, plus Metaflex® spiral wound and other metallic types.
- **Pipe supports:** Tico® Pipe Grips and Tico® Clip Strip.
- **Bolted joints:** RotaBolt® tension control fasteners.

Tube test seals



Hornet compression packing



Comflex® protector bellows



Exhaust processing

Special chimney seals and ductwork expansion joints, plus other products for exhaust gases and ash-handling plant

Air slides

Coal fired plant

- **Membranes:** Air slide duct membranes in LR5505 graphite-coated glass fibre cloth.

Ash crushers

Coal & waste fired plant

- **Rotary sealing:** Mechanical seals. Duramid® and Hornet compression packings in length form and preformed sets.

Ash hoppers

Coal & waste fired plant

- **Delivery bellows/tubes:** Comflex® bellows.
- **Hopper linings:** Water-jet cut profiles in high molecular weight polyethylene.

Ash plant Clyde valves

Coal & waste fired plant

- **Dome seals:** Precision moulded seals.
- **Trunnion seals:** 'O' rings.
- **General:** Sealing kits for valve refurbishment.

Ash plant pipework & ducting

Coal & waste fired plant

- **Pipework:** Comflex® bellows and flexible pipe connectors.
- **Flanges:** Cut gaskets in Centurion®, Sentinel® and a range of elastomeric jointing materials, plus glass tapes and ropes.
- **Ducts:** Comflex® expansion joints (dependant on country, an on-site evaluation service using thermal imaging is available, coupled with on-site installation capability).

Chimneys

Coal & waste fired plant

- **Flue linings:** Custom-designed Comflex® chimney seals of PTFE and fluoroelastomer (dependant on country, an on-site evaluation service using thermal imaging is available, coupled with on-site installation capability).

Flue gas desulphurisation (FGD) plant

Coal fired plant

- **Gaskets:** Cut gaskets in Centurion® and Supagraf® jointing materials plus Metaflex® spiral wound and other metallic types.
- **Valve stems:** Supagraf® RibbonPak M packing in length form and preformed sets.
- **Expansion joints:** Comflex® expansion joints (dependant on country, an on-site evaluation service using thermal imaging is available, coupled with on-site installation capability).



Comflex® chimney seals

Mechanical seals



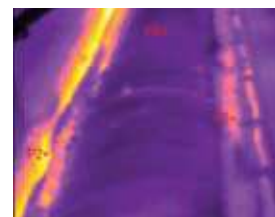
Duramid® — tough abrasion-resistant compression packing



Sealing kits for valve refurbishing



Thermal imaging



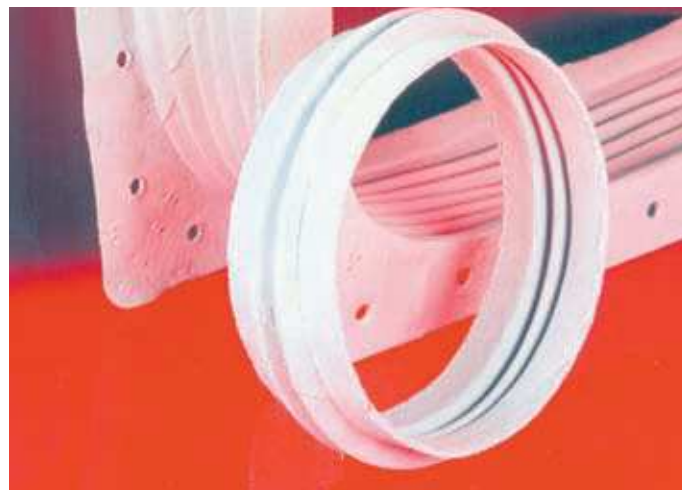
Exhaust processing — continued

More products that are well proven to work trouble-free at exhaust gas temperatures between outages

Hot exhaust gas ducting

Coal, gas, oil & waste fired plant

- **Expansion joints:** Comflex® HT/XA and GT expansion joints (dependant on country, an on-site evaluation service using thermal imaging is available, coupled with on-site installation capability).
- **Hydraulic dampers:** A full family of hydraulic sealing products.



Comflex® HT/XA expansion joints

ID fans

Coal, oil & waste fired plant

- **Expansion joints:** Comflex® expansion joints (dependant on country, an on-site evaluation service using thermal imaging is available, coupled with on-site installation capability).
- **Flanges:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials, plus Supagraf® Boilermaster preformed gaskets.
- **Shaft sealing:** Walkersele® Ultraglide radial lip seals.

Supagraf® Boilermaster preformed gaskets



Precipitators

Coal, oil & waste fired plant

- **Expansion joints:** Comflex® expansion joints (dependant on country, an on-site evaluation service using thermal imaging is available, coupled with on-site installation capability).
- **Rapping gear:** Bellows.

Walkersele® Ultraglide for hot abrasive environments



Rotary screw pumps

Coal & waste fired plant

- **Shaft sealing:** Liongraf, Hornet and Duramid® compression packings in length form and preformed sets.

Comflex® GT expansion joints



Slurry pumps

Coal & waste fired plant

- **Gaskets:** Precision cut gaskets of all types and materials.
- **Shaft sealing:** Mechanical seals. Duramid® and Hornet compression packings in length form and preformed sets.

Mechanical seals



Valves & actuators

Coal & waste fired plant

- **Gaskets:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials plus Metaflex® spiral wound and other metallic types.
- **Valve stems:** Supagraf® RibbonPak M compression packing in length form and preformed sets, plus die-pressed low friction Supagraf® Moulded Rings.

Supagraf® RibbonPak M



Turbines & Generators

Sealing products that help keep turbines and generators running smoothly and efficiently year-in and year-out

Turbine control valves & actuators

CCGT, plus coal, gas, oil & waste fired plant

- **Gaskets:** Cut gaskets in reinforced Supagraf® jointing materials, plus Metaflex® spiral wound and Metakamm® Kammprofile-types.
- **Valve stems:** Supagraf® RibbonPak M compression packing in length form, moulded rings and sets, plus die-pressed low friction Supagraf® Moulded Rings.



Flange insulation sets

Turbine lube oil & cooling systems

CCGT, plus coal, gas, oil & waste fired plant

- **Gaskets:** Cut gaskets in Centurion® and reinforced Supagraf® jointing materials plus Metaflex® spiral wound and other metallic types.
- **Flange insulation:** Sets comprising insulating gaskets, sleeves and washers.
- **Pumps shafts:** Liongraf, Fluograf® and Hornet packings in length form and preformed sets. Mechanical seals.
- **Valve stems:** Supagraf® RibbonPak compression packing in length form and pre-formed sets, plus die-pressed low friction Supagraf® Moulded Rings.

Metakamm® Kammprofile-type gaskets



Metallic gaskets



Generator stator frame

CCGT, plus coal, gas, oil & waste fired plant

- **Bearing bracket, end cover, terminal box, and apertures:** Seals and gaskets in a wide range of materials, including electrical grades of Nebar® bonded-cork jointing materials to suit all sizes and types of unit.
- **Hydrogen coolers:** Cut diaphragms. Waterbox gaskets in Nebar® Black Hi-Performance Electrical bonded-cork jointing.
- **Water cooled manifolds for windings, and associated pipework:** Cut gaskets in Centurion® and EPDM jointing materials. 'O' rings for PTFE cooling tubes.
- **Flange insulation:** Sets comprising insulating gaskets, sleeves and washers.

Precision cut gaskets in elastomer sheet jointings



Preformed compression packing sets



Generator lube oil & cooling systems

CCGT, plus coal, gas, oil & waste fired plant

- **Gaskets:** Cut gaskets in Centurion®, reinforced Supagraf®, nitrile and fluorocarbon jointing materials, plus Metaflex® spiral wound and other metallic types.
- **Flange insulation:** Sets comprising insulating gaskets, sleeves and washers.
- **Pump shafts:** Mechanical seals.
- **Oil filters:** 'O' rings, and gaskets of all types.

'O' rings are supplied in 100 general and high-performance elastomer grades



Electrical plant

Gasket materials and mounting pads that are approved and used worldwide on transformers and switchgear

Bus bars through building walls

CCGT plus coal, gas, oil & waste fired plant

- **Environmental protection bellows:** Comflex® bellows.

Generator transformers & switchgear

CCGT plus coal, gas, oil & waste fired plant

- **Flange insulation:** Sets comprising insulating gaskets, sleeves and washers.
- **Gaskets:** Cut gaskets in Nebar® Black, Red, White, Grey, Orange or Purple electrical grades of bonded cork-elastomer jointing materials — grade dependant on the application.
- **Seals:** 'O' rings in a range of high performance materials to suit transformer oils, air or SF6 gas.
- **Mounting pads:** Internal transformer mounting pads in a range of Tico® anti-vibration materials.

Other transformers & switchgear

CCGT plus coal, gas, oil & waste fired plant

- **Flange insulation:** Sets comprising insulating gaskets, sleeves and washers.
- **Gaskets:** Cut gaskets in Nebar® Black, Red, White, Grey, Orange or Purple electrical grades of bonded cork-elastomer jointing materials — grade dependant on application.
- **Seals:** 'O' rings in a range of high performance materials to suit transformer oil, air or SF6 gas.
- **Mounting pads:** Internal transformer mounting pads in a range of Tico® anti-vibration materials.



Nebar® Grey: Premium Nitrile Electrical grade — meets ABB specifications for transformers and switchgear

Nebar® Red — high pressure duties with transformers and switchgear



Tico® mounting pads



Flange insulation sets



Comflex® protection bellows



Technical guides

These guides give detailed technical information on the products and services covered in this publication. Please ask for your copies, or visit our website www.jameswalker.biz where many of them can be downloaded in pdf form.



Gaskets & jointings



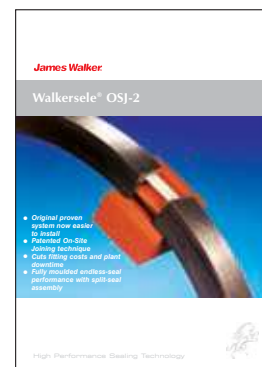
Complex® expansion joints & bellows



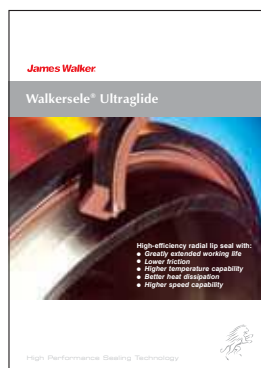
Compression packings



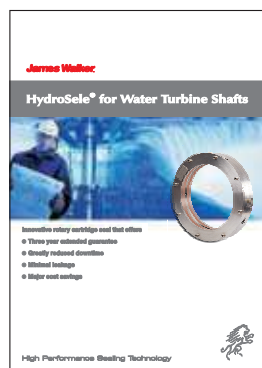
Hydraulic seals



Walkersele® OSJ-2



Walkersele® Ultraglide



HydroSeal®



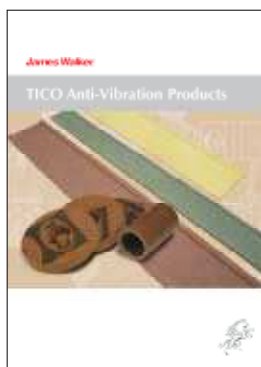
Cartridge seals



'O' rings



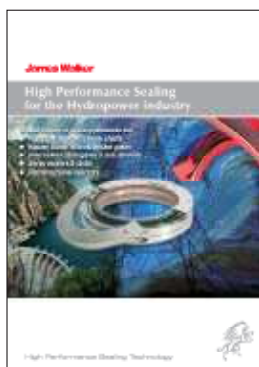
RotaBolt® tension control



Mounting pads & buffers



Pipe support products



Hydropower Industry

Trademark acknowledgement

James Walker acknowledges the following trademark as mentioned in this publication. All other names bearing the ® symbol are registered trademarks of James Walker.

Kalrez® DuPont Performance Elastomers

General information

Health warning: If PTFE or fluoroelastomer (eg, FKM, FFKM, FEPM) products are heated to elevated temperatures, fumes will be produced which may give unpleasant effects, if inhaled. Whilst some fumes are emitted below 250°C from fluoroelastomers or below 300°C from PTFE, the effect at these temperatures is negligible. Care should be taken to avoid contaminating tobacco with particles of PTFE or fluoroelastomer, 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 affect 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.

James Walker companies worldwide

James Walker & Co

Tel: +44 (0)1270 536000
Fax: +44 (0)1270 536100
Email: csc@jameswalker.biz

James Walker Australia

Tel: +61 (0)2 9644 9755
Fax: +61 (0)2 9645 2009
Email: jwadmin@jameswalker.com.au

James Walker Benelux

(Belgium)
Tel: +32 3 820 7900
Fax: +32 3 828 5484
Email: sales.be@jameswalker.biz
(Netherlands)
Tel: +31 (0)186 633111
Fax: +31 (0)186 633110
Email: sales.nl@jameswalker.biz

James Walker China

Tel: +86 21 5117 5802
Fax: +86 21 5116 6899
Email: info.cn@jameswalker.biz

James Walker Deutschland

Tel: +49 (0)40 386 0810
Fax: +49 (0)40 389 3230
Email: info@jameswalker.de

James Walker France

Tel: +33 (0)437 497 480
Fax: +33 (0)437 497 483
Email: headoffice.fr@jameswalker.biz

James Walker Iberica

Tel: +34 94 447 0099
Fax: +34 94 447 1077
Email: iberica@jameswalker.biz

James Walker Ireland

Tel: +353 (0)21 432 3626
Fax: +353 (0)21 432 3623
Email: sales.ie@jameswalker.biz

James Walker Italiana

Tel: +39 02 257 8308
Fax: +39 02 263 00487
Email: jameswalker@jameswalker.it

James Walker Mfg (USA)

Tel: +1 708 754 4020
Fax: +1 708 754 4058
Email: sales.jwmfg.us@jameswalker.biz

James Walker New Zealand

Tel: +64 (0)9 272 1599
Fax: +64 (0)9 272 3061
Email: sales@jameswalker.co.nz

James Walker Norge

Tel: +47 22 706800
Fax: +47 22 706801
Email: firmapost@jameswalker.no

James Walker Oil & Gas (USA)

Tel: +1 281 875 0002
Fax: +1 281 875 0188
Email: oilandgas@jameswalker.biz

James Walker Singapore

Tel: +65 6777 9896
Fax: +65 6777 6102
Email: sales@jameswalker.com.sg

James Walker South Africa

Tel: +27 (0)31 205 6251/2/3
Fax: +27 (0)31 205 6266
Email: info.za@jameswalker.biz

James Walker & Co Ltd

Power Generation Industry Support Team
1 Millennium Gate, Westmere Drive
Crewe, Cheshire CW1 6AY, UK
Tel: +44 (0)1270 536000
Fax: +44 (0)1270 536100
Email: powergen.jwc.uk@jameswalker.biz

www.jameswalker.biz



CERTIFICATE No. FM 01269
BS EN ISO 9001:2000