James Walker Moorflex

Metal seals & components for the Oil & Gas industry

Unrivalled Expertise in Bespoke Machined Annular Parts

Introduction

James Walker at the heart of the oil & gas industry

James Walker has long been committed to the provision of sealing solutions for the Upstream and Downstream oil & gas industries.

As the technology employed to exploit natural resources has developed, the materials and products used have likewise had to evolve in order to provide essential reliability under increasingly arduous operating conditions.

Over the years James Walker has invested In the necessary infrastructure with advanced manufacturing facilities and test laboratories, supported by technologists and engineers, offering maximum production flexibility.

Our staff work closely with many of the world's major oil companies and original equipment manufacturers to develop sealing technologies that deliver optimum performance in a range of hostile operating environments.

This philosophy has fostered the constant development of improved materials, processes and new generations of products that push forward the boundaries. Our comprehensive research, development and testing programmes ensuring that each design or material innovation, verified and validated to industry and customer-specific standards.

By this means, and through bringing new companies with complementary technology, design and manufacturing skills into the James Walker group, we have maintained and enhanced our reputation as a world leader in the materials and design technology behind the engineering solutions required by today's oil and gas industry.

With key hubs located in the UK, Singapore and Houston, James Walker provides a true global service with the added benefit of local representation and technical service.

The full range of products and services offered by James Walker companies now includes;

James Walker & Co Ltd –
Elastomeric seals, compression packings and cut gaskets

James Walker Moorflex –
Metallic gaskets and specialist metal machining services

James Walker Townson –
Fabric, metallic and rubber expansion joints

James Walker RotaBolt –
Patented tension control fasteners

James Walker Devol –
Advanced engineered thermoplastics

Contents

Our commitment to your business 4
Machine shop capabilities 6
Maintaining exacting standards 7
Quality Assurance
Total traceability
Skills training for the future
Precision machined components for surface & subsea duties 8
Moorflex expertise 10
Thin-wall machining
Metal-to-rubber bonding
Materials & coatings 11
Metal ring joint gaskets 12
James Walker – products and services 17
Technical guides & General Information 19
Contacts 20

James Walker Moorflex

Profile

The engineering reputation of James Walker Moorflex is founded on quality. We meet our customers' expectations by providing the highest level of precision machining of high performance alloys and standard materials. We supply proprietary components and standard items to exacting specifications on a global basis.

Major operators and OEMs in the oil & gas sector have relied on our renowned engineering expertise and skilled workmanship for over 40 years in the production of API metal ring joint gaskets. The proven reliability of these items, displayed by their ability to operate the full oilfield life cycle, is at the heart of our success.

For the past 25 years, we have also manufactured proprietary components for the OEM market where innovation and long-term reliability are imperative. This has necessitated the development and implementation of special in-house machining techniques that enable us repeatedly to supply precision components from high-nickel and standard alloys.

Our capability is enhanced by being a member of the James Walker Group, the dynamic manufacturer and industrial services provider with over 50 production, engineering, distribution and customer support sites spread across Europe, Asia, Australasia, Africa and the Americas.

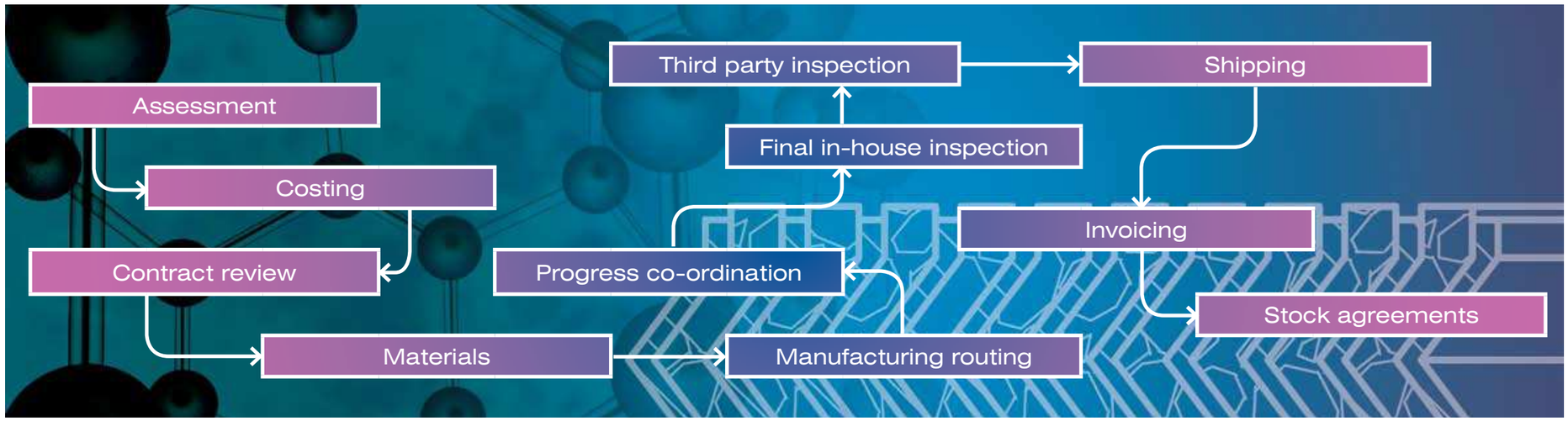
Growth and development

- **1956:** Moorside Machining founded in the North of England as a small machining company.
- **1963:** API 6A Accreditation gained for the manufacture of ring joint gaskets.
- **1966:** Expansion of ring joint gasket business necessitated relocation to larger premises.
- **1977:** Became wholly owned subsidiary of James Walker Group.
- **1986:** Accredited to API Spec Q1 and third-party registered to BS 5750 (now BS EN ISO 9001:2000). We were the first gasket manufacturer in Europe to meet these QA requirements.
- **2000:** Merged with James Walker Metaflex to become James Walker Moorflex. The Bingley factory continued its focus on precision machining of special high performance alloys.
- **2000 - today:** An established market leader in the manufacture of ring joints, metal seals and bespoke metal components for OEM and end-user clients. Provide services on a 24/7 basis, 365 days a year, to meet customers' most urgent demands worldwide.
- Development of overseas low cost manufacturing facilities under the strict Moorflex quality management regime to meet market needs without compromising on product reliability.

Our commitment to your business

From the first moment that you contact us — for standard or proprietary components — you will be dealing with members of a dedicated professional team who fully understand your requirements and know precisely how James Walker Moorflex can meet your demands.

The service we offer for the manufacture of proprietary components is assured, with highly skilled engineers and experienced staff responsible for every part of the operation. The stages that your component goes through are simple yet exceedingly thorough.



LICENSED UNDER
API Spec 6A-0038

Assessment
Our product engineers study your CAD file or drawings, and select the most efficient and economical manufacturing method and routing.

Costing
We source material that meets your specification in a form that allows the most cost-effective manufacture, calculate the manufacturing methods and times, and factor in any post-machining processes (eg, NDT and coatings) before the quotation is issued.

Contract review
On receipt of your order, we check your Bill of Materials from QP to marking instructions, and countersign that all revisions on our manufacturing system are exactly in accordance with your latest specifications.

Materials
Where available, we immediately allocate stocked materials to the project, or order materials specifically for it. Special high-performance alloys are sourced only from approved suppliers, primarily in Western Europe and North America.

At receipt of material, dimensional and hardness checks are automatically conducted. Accompanying Mill Certification and documentation are reviewed against specification, then computer recorded and filed for reference.

Manufacturing routing
The manufacturing route is entered on our constrained planning system with a critical path analysis for all machine operations and processes, including all post-machining testing, treating and coating requirements.

Progress co-ordination
Your project is expedited and monitored through all machining stages via shop floor data capture, with intermediate inspection at all key phases.

Oracle® 11i
From the moment you first make contact with James Walker Moorflex every detail of your order and ongoing business is recorded, monitored and progressed utilising Oracle 11i enterprise management systems - helping ensure we control costs, eliminate complexity and maximise efficiencies to provide you with the best possible levels of customer service.

Final in-house inspection
This is performed in accordance with your specifications by our Inspection Department using a combination of both traditional and the most advanced CMM equipment. Final hardness testing ensures that the specified level has been maintained.

NDT processes include ultrasonic testing, positive material identification (PMI), liquid penetrant inspection (LPI) and magnetic particle inspection (MPI).

PREN calculations, material grain size analysis, intergranular corrosion testing, and full verification of mechanical properties, are all available.

Third party inspection
When requested, we can provide inspection facilities and full documentation packages for your nominated independent inspectors.

Shipping
We pack all components to your specification, or to our in-house standards. They are delivered by courier service or we arrange collection by your service provider.

Invoicing
Financial invoices are prepared and forwarded to you on the day of despatch, so that all relevant documentation coincides.

Stock agreements
When required, we are prepared to hold stocks of your specified materials, or finished components, in readiness to meet your manufacturing or production schedules.

Machine shop capabilities

Our purpose-built machine shop has been developed to produce both standard API rings and more complex proprietary components.

The production of API rings is now largely automated, which enables our highly skilled workforce to focus on the manufacture of bespoke and special components including a full range of connector gaskets. Thin wall annular rings, such as metal-to-metal seals, bonnet gaskets, casing hangers, pack-off elements, choke seals, riser joints, and many more items are manufactured against customer requirements.

Our current machine tools and their capacities present customers with a unique insight to our operations.

Machining centres

Our range of fully automated machining centres includes a state-of-the-art 5-axis machine, plus a number of 3-axis models with multiple tool stations.

With this plant, we handle a wide variety of work pieces that require numerous complex machining operations with high precision and a top quality finish.

CNC lathes

The majority of our work requires high precision turning operations. Our vast array of CNC lathes gives us the flexibility to manufacture a wide range of components from 25mm (0.98in) to 2300mm (90.6in) diameter.

Most of our CNC lathes work within the diameter range of 553mm (21in) to 1118mm (44in) to cover the production requirements for the majority of metal ring joint gaskets for the oil & gas sector.

CAD/CAM profile cutters

Laser cutting: All our machines feature automatic nesting for optimum material usage. They handle sheets up to 3m x 1.5m (118in x 59in), and cut carbon steel to 20mm (0.79in) thickness, stainless steels to 10mm (0.39in). They are also suitable for nickel alloys.

Water-jet cutting: Our abrasive water-jet machines also have automatic nesting facilities. They handle sheets up to 3m x 2m (118in x 79in), and cut cleanly ***any*** sheet material from thin foil up to 100mm (3.9in) thickness.

Other precision machining plant

Our machine shop also contains a CNC router, a cell of manual lathes, vertical and horizontal milling machines, and spark erosion equipment.

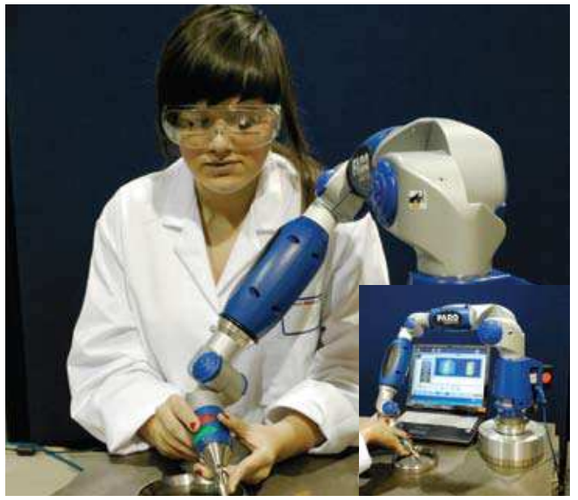
Future developments

We are constantly investing in new advanced CNC machinery to extend our capabilities and services to customers.

Please contact us for an up-to-date inventory of our machines and our machine shop capability.

James Walker Moorflex

Maintaining exacting standards



Quality Assurance

Product quality, customer support and service are key elements in the successful relationships built between our customers and ourselves. Every effort is made constantly to achieve the highest standards. We underpin these standards with the following third-party assessed Quality Systems approvals:

- **BS EN ISO 9001:2000.**
- **API Spec Q1-Standard 6A** — which entitles us to apply the API monogram and our licence number on API–related ring joint gaskets.
- **Quality-approved supplier** status for numerous original equipment manufacturers across the world.

Total traceability

Every component we manufacture can be traced back to the original batch of metal and a specific billet. Our computerised records that follow each machined item contain:

- Mill Certification and heat treatment documentation from the material supplier.
- Our in-house hardness test verification results for that batch of material.
- Which machines were used to manufacture the component.
- In-house dimensional report from our Inspection Department.
- Final hardness test results, to ensure that any work hardening has not exceeded customer specifications.
- Full details of any post machining annealing, coating or NDT work undertaken.
- Third party inspection results, to customer's specification, as required.

Skills training for the future

We recognise that the best way to maintain and enhance our skills base is to train and retain our own engineering personnel.

Our mentor-based apprentice scheme guides enthusiastic and dedicated young people through numerous career stages, including NVQ2, HNC, quality management, BSc degree courses, and onwards to constant improvement programmes.

All apprentices experience an extensive nationally accredited training programme to learn workshop skills and engineering practice, supported by academic qualifications from local technical colleges and universities.

This apprentice scheme is a key element of our strategy to maintain the high levels of manufacturing competence and quality control that enable us to provide customers with world class products and services.

Precision machined components...

Our machined components enhance the efficiency and reliability of exploration and production operations at oil and gas fields around the world.

Typical areas of application include:

- **Wellheads**
- **Manifolds**
- **BOPs**
- **Production safety valves**
- **Risers**
- **Valves**
- **Chokes**
- **Pipelines**

Benefits of using our services and products

- Totally conversant with industry standards and quality plans.
- Many years' experience of oil & gas industry applications.
- Understand sweet and sour environments and the materials required.
- All high-performance alloys are sourced from trusted suppliers in the USA and Western Europe.
- Full materials traceability, with permanent records held.
- All machining undertaken is fully-controlled in-house.
- Precision machining capabilities up to 2.3m (90.6in) diameter.
- High integrity metal-to-rubber bonding.
- NDT, coatings and heat treatment conducted by approved and certified subcontractors.

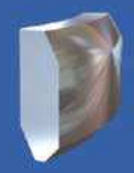
Our expertise; your products

The following illustrations depict just a small selection of the metallic seals, gaskets and other components we precision manufacture for the oil & gas industry.

Our expertise in the precision machining of exotic alloys, or standard grade materials, to your exact specifications is at the heart of the overall service we provide.

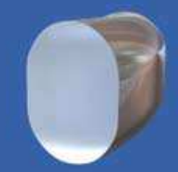
Metal lip seal

Metal seal



Lockdown ring

AX ring gasket



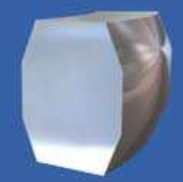
API ring joint R (oval)

Metal-to-metal sealing ring

Casing hanger seal

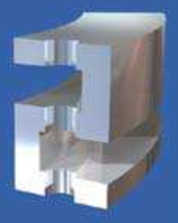
H4 ring gasket

KX metal seal



API ring joint R (octagonal)

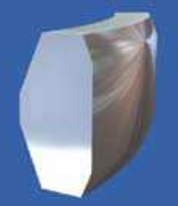
Metal lip seal



Tubing hanger pack-off

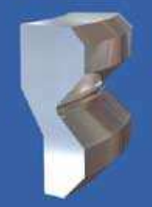
AX ring gasket

FX metal body seal



API ring joint RX

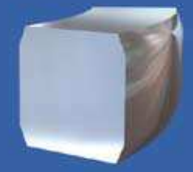
Metal seal



Lockdown ring

AX ring gasket

IX ring joint

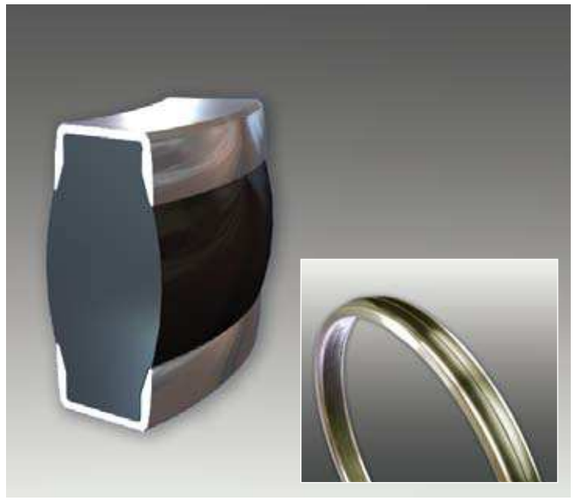


API ring joint BX

James Walker Moorflex

for surface & subsea duties

Moorflex expertise



Thin-wall machining

The need for precision machined components in the oil & gas sector has increased substantially as exploration and production operations go deeper and into more demanding environments.

Over the past few years, James Walker Moorflex has developed and perfected special manufacturing techniques for the precision machining of annular thin-walled components.

Our expertise prevents thin-walled components being crushed on the machine, whilst allowing precise profiles to be achieved repeatedly to tight tolerances and with absolute concentricity.

Many of these components are manufactured from high-nickel alloys that are notoriously difficult to machine and control.

We are able to machine components in-house of sizes from 25mm (0.98in) OD to 2300mm (90.6in) OD, and to a maximum depth of 250mm (9.8in).

Metal-to-rubber bonding

In partnership with our sister company, James Walker & Co, we manufacture metallic - elastomeric composites, providing customers with versatile metal and rubber seals for a range of applications.

This capability covers the vast majority of high performance elastomers used in the oil & gas sector, including nitrile (NBR), hydrogenated nitrile (HNBR), fluoroelastomer (FKM) and tetrafluoroethylene/propylene copolymers (FEPM) such as Aflas®.

Our highly developed processes incorporate acid etch, phosphating, and chemical cleaning of metal surfaces to achieve optimum bond strength.

We apply these techniques extensively in the manufacturer of specialised oilfield sealing products for wellheads, chokes and valves.

James Walker Moorflex

Materials & coatings

We are highly experienced at the machining of difficult-to-work exotic alloys, as well as all standard grade materials. The following is an inventory of metals that we machine regularly — many of these we hold in stock.

The full list of materials we work with is far more comprehensive, so if the grade you have specified is not included, please contact us.

Material	Trade name	Description
Alloy 600	Inconel® 600	Alloy of 70% nickel, 15% chromium, 8% iron.
Alloy 625	Inconel® 625	Nickel/chromium alloy, with additions of molybdenum and niobium.
Alloy 716	Inconel® 716	Nickel/chromium super alloy, with 29% iron, 12% cobalt, 3.5% tungsten and 3% molybdenum.
Alloy 718	Inconel® 718	Nickel/chromium alloy steel, with 13% iron, 5% niobium and 3% molybdenum.
Alloy 800	Incoloy® 800	32% nickel, 20% chromium, 46% iron content alloy steel.
Alloy 825	Incoloy® 825	Nickel, chromium, iron, molybdenum and copper alloy.
Alloy 200	Nickel 200	Commercially pure (99.6%) wrought nickel.
Alloy 400	Monel® 400	67% nickel, 30% copper alloy.
Alloy B2	Hastelloy® B2	Nickel/molybdenum alloy.
Alloy C276	Hastelloy® C276	Nickel/chromium/molybdenum alloy.
Alloy 20	Carpenter® 20	Nickel/chromium/iron alloy steel.
Alloy X-750	Inconel® X-750	Nickel/chromium/iron alloy steel.
Titanium	-	High purity titanium material.
316	-	18/12 chromium/nickel austenitic steel with 2% molybdenum.
316L	-	316 variant with reduced carbon.
304	-	18/8 chromium/nickel austenitic stainless steel.
304L	-	304 variant with reduced carbon.
321	-	18/10 chromium/nickel austenitic stainless steel with added titanium.
347	-	18/10 chromium/nickel austenitic stainless steel with added niobium.
317	-	18/13 chromium/nickel austenitic stainless steel with 3% molybdenum.
410	-	13% chromium, 0.15% carbon, martensitic alloy steel.

Coatings & heat treatments

Your components can be finished in a wide range of coatings, including:

- Xylan® fluoropolymer
- Zinc phosphate
- Molybdenum disulphide
- Silver
- Gold
- Zinc

Heat treatment processes include:

- Nitriding
- Vacuum annealing
- Stress relieving

James Walker Moorflex

Moorside® Metal ring joint gaskets

Protection

Soft iron and low carbon steel ring joint gaskets to API Standard 6A are supplied with zinc plating to 0.0002” - 0.0005” thick unless otherwise specified. Other platings are also available if preferred. Unplated rings are treated with a rust preventative fluid.

During storage and handling it is very important that the mating faces (the oval radius or the chamfered face) are not damaged as this can lead to leakage when the ring joint is used in its particular application.

To afford the maximum degree of protection, Moorflex offer as an extra feature individual vacuum packaging. Gaskets are vacuum packed using a strong clear film onto a stout backing board. This style of packaging ensures full protection of the gasket, whilst allowing visual inspection of its condition and marking.

How to order

The styles described are manufactured as standard and are available ex-stock or to short lead-times. When ordering please submit the following data:

- *Gasket standard.*
- *Relevant ring number or nominal pipe size with rating.*
- *Material required.*
- *Oval or octagonal shape for Style ‘R’ gaskets.*
- *Quantity and required delivery.*

Materials

Gasket metal should be selected to suit the service conditions and should be of a hardness lower than the flange metal. At Moorflex, the annealing process of the metal and the machining is carefully controlled to keep the hardness of the gasket below the maximum allowable, to ensure correct flow and sealing without damage to the flange surfaces.

Checks carried out during manufacture ensure that the hardness of the finished product does not exceed the figures stated below.

The principal types of material are:

METAL	MAXIMUM HARDNESS IDENTIFICATION ROCKWELL B
SOFT IRON	56 (90 BHN) D
LOW CARBON STEEL	68 (120 BHN) S
F5 ALLOY STEEL (4/6% Cr, 1/2% Mo)	72 (130 BHN) F5
410 ALLOY STEEL (11/13% Cr)	86 (170 BHN) S410
304 STAINLESS STEEL	83 (160 BHN) S304
304L STAINLESS STEEL	83 (160 BHN) S304L
316 STAINLESS STEEL	83 (160 BHN) S316
316L STAINLESS STEEL	83 (160 BHN) S316L
347 STAINLESS STEEL	83 (160 BHN) S347
321 STAINLESS STEEL	83 (160 BHN) S321
825 NICKEL ALLOY	93 (200 BHN) 825

Other stainless and super alloy steels, Duplex, Monel®, Inconel®, Incoloy®, nickel and other materials are available. Based oı almost 50 years of experience, Moorflex have established specifications to ensure gasket suitability. Certification and compliance with NACE MRO175 are standard features.

Identification and traceability

For convenience in ordering, numbers are assigned to gaskets and prefixed by the letter ‘R’, ‘RX’ or ‘BX’, followed by the material identification. Marking is effected so as not to injure the contact faces, nor to harmfully distort the gasket. Moorflex use only low stress DOT stamps approved to NACE standards in order to ensure that stresses are not introduced into the gasket.

All non-API gaskets are typically marked Moorside R45 S316. Gaskets complying to API Standard 6A are additionally marked with API Monogram Licence No., Product Specification Level 4 and date of manufacture. (It is standard procedure for Moorflex to supply API 6A gaskets to PSL4).

All API gaskets are typically marked:-

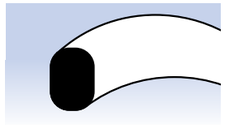
Moorside Ⓓ 6A-0038 R45 S316-4 12/2001 (December 2001).

Traceability of material and constant monitoring of manufacture are essential for effective quality control. All Moorside ring joint gaskets carry a **Material Reference Number,** which directly relates to the batch of material from which it was manufactured. The MRN number is applied to the gasket in the same way as the identification marks. This reference is included in material certificates, thus ensuring full traceability of supply.

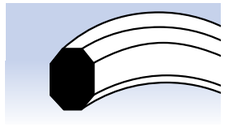
Moorside or Ⓜ denotes James Walker Moorflex trade mark.

Gasket styles and types

Series ‘R’ Oval



Series ‘R’ Octagonal



The **type R oval** configuration is the original ring joint design and was followed by the **type R octagonal** which offered more specific sealing contact areas. Both types can be used with flanges having the standard ring joint flat bottom groove and hold off flanges by a specified amount, relying entirely on correctly applied initial bolt-load for their proper operation in service.

Available in ring numbers R11 through R105 to suit the following flange specifications:

NOMINAL PIPE SIZE	CLASS RATING AND STANDARD
1/2” - 24”	150 - 2500 ASME B16.5 and BS1560
26” - 36”	300 - 600 MSS SP44 and BS 3293
26” - 36”	900 MSS SP44
1 1/2” - 20”	API Spec. 6A

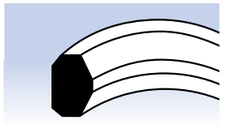
Series ‘R’ manufactured to the standards ASME B 16.20 - API Std 6A BS EN 12560-5

			HEIGHT			NOMINAL BORES					
Ring Number	Pitch	Width	Oval	Octagonal	Width of flat on octagonal ring	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500
R11	1.344	0.25	0.44	0.38	0.17		0.5	0.5			
R12	1.563	0.313	0.56	0.5	0.206				0.5	0.5	
R13	1.688	0.313	0.56	0.5	0.206		0.75	0.75			0.5
R14	1.75	0.313	0.56	0.5	0.206				0.75	0.75	
R15	1.875	0.313	0.56	0.5	0.206	1					
R16	2	0.313	0.56	0.5	0.206		1	1	1	1	0.75
R17	2.25	0.313	0.56	0.5	0.206	1.25					
R18	2.375	0.313	0.56	0.5	0.206		1.25	1.25	1.25	1.25	1
R19	2.563	0.313	0.56	0.5	0.206	1.5					
R20†	2.688	0.313	0.56	0.5	0.206		1.5	1.5	1.5	1.5	
R21	2.844	0.438	0.69	0.63	0.305						1.25
R22	3.25	0.313	0.56	0.5	0.206	2					
R23†	3.25	0.438	0.69	0.63	0.305		2	2			1.5
R24†	3.75	0.438	0.69	0.63	0.305				2	2	
R25	4	0.313	0.56	0.5	0.206	2.5					
R26†	4	0.438	0.69	0.63	0.305		2.5	2.5			2
R27†	4.25	0.438	0.69	0.63	0.305				2.5	2.5	
R28	4.375	0.5	0.75	0.69	0.341						
R29	4.5	0.313	0.56	0.5	0.206	3					
R30	4.625	0.438	0.69	0.63	0.305		3	3			
R31†	4.875	0.438	0.69	0.63	0.305		3	3	3		
R32	5	0.5	0.75	0.69	0.341						3
R33	5.188	0.313	0.56	0.5	0.206	3.5					
R34	5.188	0.438	0.69	0.63	0.305		3.5	3.5			
R35†	5.375	0.438	0.69	0.63	0.305					3	
R36	5.875	0.313	0.56	0.5	0.206	4					
R37†	5.875	0.438	0.69	0.63	0.305		4	4	4		
R38	6.188	0.625	0.88	0.81	0.413						4
R39†	6.375	0.438	0.69	0.63	0.305					4	
R40	6.75	0.313	0.56	0.5	0.206	5					
R41†	7.125	0.438	0.69	0.63	0.305		5	5	5		
R42	7.5	0.75	1	0.94	0.485						5
R43	7.625	0.313	0.56	0.5	0.206	6					
R44†	7.625	0.438	0.69	0.63	0.305					5	
R45†	8.313	0.438	0.69	0.63	0.305		6	6	6		
R46†	8.313	0.5	0.75	0.69	0.341					6	
R47†	9	0.75	1	0.94	0.485						6
R48	9.75	0.313	0.56	0.5	0.206	8					
R49†	10.625	0.438	0.69	0.63	0.305		8	8	8		

All dimensions are in inches. † Denotes API Std. 6A Ring Joint Gaskets.

			HEIGHT			NOMINAL BORES					
Ring Number	Pitch	Width	Oval	Octagonal	Width of flat on octagonal ring	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500
R50†	10.625	0.625	0.88	0.81	0.413					8	
R51	11	0.875	1.13	1.06	0.583						8
R52	12	0.313	0.56	0.5	0.206	10					
R53†	12.75	0.438	0.69	0.63	0.305		10	10	10		
R54†	12.75	0.625	0.88	0.81	0.413					10	
R55	13.5	1.125	1.44	1.38	0.78						10
R56	15	0.313	0.56	0.5	0.206	12					
R57†	15	0.438	0.69	0.63	0.305		12	12	12		
R58	15	0.875	1.13	1.06	0.583					12	
R59	15.625	0.313	0.56	0.5	0.206	14					
R60	16	1.25	1.56	1.5	0.879						12
R61	16.5	0.438	0.69	0.63	0.305		14	14			
R62	16.5	0.625	0.88	0.81	0.413				14		
R63†	16.5	1	1.31	1.25	0.681					14	
R64	17.875	0.313	0.56	0.5	0.206	16					
R65†	18.5	0.438	0.69	0.63	0.305		16	16			
R66†	18.5	0.625	0.88	0.81	0.416				16		
R67	18.5	1.125	1.44	1.38	0.78					16	
R68	20.375	0.313	0.56	0.5	0.206	18					
R69†	21	0.438	0.69	0.63	0.305		18	18			
R70†	21	0.75	1	0.94	0.485				18		
R71	21	1.125	1.44	1.38	0.78					18	
R72	22	0.313	0.56	0.5	0.206	20					
R73†	23	0.5	0.75	0.69	0.641		20	20			
R74†	23	0.75	1	0.94	0.485				20		
R75	23	1.25	1.56	1.5	0.879					20	
R76	26.5	0.313	0.56	0.5	0.206	24					
R77	27.25	0.625	0.88	0.81	0.413		24	24			
R78	27.25	1	1.31	1.25	0.681				24		
R79	27.25	1.375	1.75	1.63	0.977					24	
R80	24.25	0.313		0.5	0.206	22					
R81	25	0.563		0.75	0.377		22	22			
R82†	2.25	0.438		0.63	0.305						
R84†	2.5	0.438		0.63	0.305						
R85†	3.125	0.5		0.69	0.341						
R86†	3.563	0.625		0.81	0.413						
R87†	3.938	0.625		0.81	0.413						
R88†	4.875	0.75		0.94	0.485						
R89†	4.5	0.75		0.94	0.485						
R90†	6.125	0.875		1.06	0.583						
R91†	10.25	1.25		1.5	0.879						
R92	9	0.438	0.69	0.63	0.305						
R93	29.5	0.75		0.94	0.485		26	26			
R94	31.5	0.75		0.94	0.485		28	28			
R95	33.75	0.75		0.94	0.485		30	30			
R96	36	0.875		1.06	0.583		32	32			
R97	38	0.875		1.06	0.583		34	34			
R98	40.25	0.875		1.06	0.583		36	36			
R99†	9.25	0.438		0.63	0.305						
R100	29.5	1.125		1.38	0.78				26		
R101	31.5	1.25		1.5	0.879				28		
R102	33.75	1.25		1.5	0.879				30		
R103	36	1.25		1.5	0.879				32		
R104	38	1.375		1.63	0.977				34		
R105	40.25	1.375		1.63	0.977				36		

All dimensions are in inches. † Denotes API Std. 6A Ring Joint Gaskets.



Series 'RX'

As well-head pressures increased to 700 bar (10,000lbf/in^2) and beyond, flanges designed with type 'R' oval or octagonal rings became excessively heavy, requiring impracticably large bolts to perform the double duty of holding pressure while keeping the gasket compact.

The solution to this problem was found in higher strength materials and the development of the 'RX' and 'BX' series joint which are pressure energised. (The higher the contained pressure, the tighter the seal).

The 'RX' Style Ring Joint has the unique self-sealing action. The outside bevels of the ring make the initial contact with the groove as the flanges are brought together, thus pre-loading the gasket against the grooved outer surfaces. Internal pressure during service increases this loading and, therefore, the gasket's sealing performance.

Available in ring numbers RX20 through RX215 to suit the following flange specifications:

NOMINAL PIPE SIZE	CLASS RATING AND STANDARD
1 1/2" - 20"	720 - 5,000 API 6B Flanges

Series 'RX' manufactured to the standards ASME B 16.20 - API Std 6A

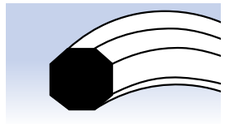
GASKET DIMENSIONS				PRESSURE CLASS RATING			
Ring No.	I/D	O/D	Height	720-960 2000	2900	3000	5000
				Nominal Pipe Size			
RX 20	2.313	3.000	0.750	1.1/2		1.1/2	
RX 23	2.672	3.672	1	2			
RX 24	3.234	4.172	1			2	2
RX 25	3.625	4.313	0.750				3.1/8
RX 26	3.469	4.406	1	2.1/2			
RX 27	3.719	4.656	1			2.1/2	2.1/2
RX 31	4.359	5.297	1	3		3	
RX 35	4.859	5.797	1				3
RX 37	5.359	6.297	1	4		4	
RX 39	5.859	6.797	1				4
RX 41	6.609	7.547	1	5		5	
RX 44	7.109	8.047	1				5
RX 45	7.797	8.734	1	6		6	
RX 46	7.688	8.750	1.125				6
RX 47	8.094	9.656	1.625				8
RX 49	10.109	11.047	1	8		8	
RX 50	9.844	11.156	1.250				8
RX 53	12.234	13.172	1	10		10	
RX 54	11.969	13.281	1.250				10
RX 57	14.484	15.422	1	12		12	
RX 63	15.266	17.391	2				14
RX 65	17.984	18.922	1	16			
RX 66	17.719	19.031	1.250			16	
RX 69	20.484	21.422	1	18			
RX 70	20.094	21.656	1.625			18	
RX 73	22.406	23.469	1.250	20			
RX 74	22.094	23.656	1.625			20	
RX 82	1.734	2.672	1		1		
RX 84	1.984	2.922	1		1.1/2		
RX 85	2.484	3.547	1		2		
RX 86	2.891	4.078	1.125		2.1/2		
RX 87	3.266	4.453	1.125		3		
RX 88	4.109	5.484	1.250		4		
RX 89	3.672	5.109	1.250		3.1/2		
RX 90	5.188	6.875	1.750		5		
RX 91	8.922	11.297	1.781		10		
RX 99	8.734	9.672	1	8		8	
RX 201	1.573	2.026	0.445				1.3/8
RX 205	2.016	2.453	0.437				1.13/16
RX 210	3.094	3.844	0.750				2.9/16
RX 215	4.609	5.547	1				4 .1/16

All dimensions are in inches. † Denotes API Std. 6A Ring Joint Gaskets.

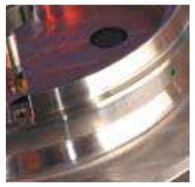
Designed to API specifications for use with grooved flanges on special applications involving high pressure up to 20,000 p.s.i. the 'BX' series is available in ring numbers BX 150 through BX 303 to suit the following flange specifications:

NOMINAL PIPE SIZE	CLASS RATING AND STANDARD
$1^{11}/_{16}$" - $21^{1}/_{4}$"	5,000-20,000 API 6 BX Flanges

Style 'BX' Ring Joint Gaskets can only be used with special 'BX' grooves and are not interchangeable with the Style 'RX' series.



Series 'BX'



Series 'BX' manufactured to the standards ASME B 16.20 - API Std 6A

GASKET DIMENSIONS				PRESSURE CLASS RATING					
Ring No.	I/D	O/D	Height	2000	3000	5000	10000	15000	20000
				Nominal Pipe Size					
BX 150	2.110	2.842	0.366				1.11/16	1.11/16	
BX 151	2.250	3.008	0.379				1.13/16	1.13/16	
BX 152	2.528	3.334	0.403				2.1/16	2.1/16	2.1/16
BX 153	3.078	3.974	0.448				2.9/16	2.9/16	2.9/16
BX 154	3.624	4.600	0.488				3.1/16	3.1/16	3.1/16
BX 155	4.705	5.825	0.560				4.1/16	4.1/16	4.1/16
BX 156	7.901	9.637	0.733				7.1/16	7.1/16	7.1/16
BX 157	9.941	11.593	0.826				9	9	
BX 158	12.038	13.860	0.911				11	11	11
BX 159	14.776	16.800	1.012				13.5/8	13.5/8	13.5/8
BX 160	14.768	15.850	0.938			13.5/8			
BX 161	18.071	19.347	1.105			16.3/4			
BX 162	17.600	18.720	0.560			16.3/4	16.3/4	16.3/4	
BX 163	20.528	21.896	1.185			18.3/4			
BX 164	20.527	22.463	1.185				18.3/4	18.3/4	
BX 165	23.139	24.595	1.261			21.1/4			
BX 166	23.140	25.198	1.261				21.1/4		
BX 167	28.864	29.896	1.412	26.3/4					
BX 168	28.864	30.128	1.412		26.3/4				
BX 169	5.813	6.831	0.624				5.1/8		
BX 170	7.464	8.584	0.560				6.5/8	6.5/8	
BX 171	9.409	10.529	0.560				8.9/16	8.9/16	
BX 172	11.993	13.113	0.560				11.5/32	11.5/32	
BX 303	32.237	33.573	1.494	30	30				

James Walker Moorflex

James Walker products and services

James Walker & Co Advanced elastomer science

With James Walker you have access to leading edge development in elastomeric sealing products.

Our in-house capabilities and expertise extend from materials chemistry and applications engineering through prototyping and manufacture to some of the most comprehensive testing facilities currently available.

Our ability to carry out exhaustive RGD testing and simulate operational conditions in extreme environments helps ensure James Walker elastomeric sealing solutions remain at the forefront of sealing technology within the Oil & Gas industry.

James Walker RotaBolt Tension control technology

RotaBolt® is alternative engineering at its very best.

Replacing traditional engineering practice, this unique product guarantees installation to a pre-set tension and continues to accurately measure the tension maintained across the bolted joint.

Providing a simple visual or tactile check of tension, RotaBolt technology has been instrumental in improving safety and reducing maintenance costs and is fast becoming the industry standard bolting system for critical applications in harsh conditions.

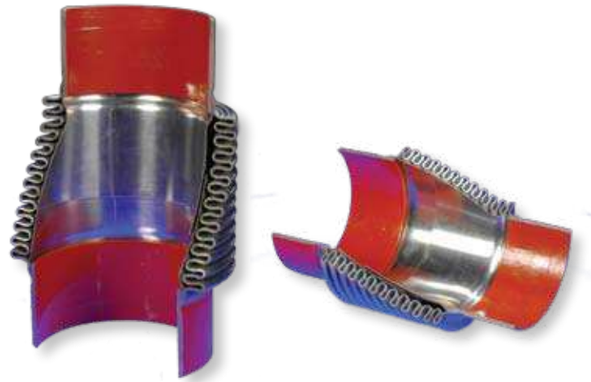
James Walker products & services

James Walker Devol
Thermoplastic engineering

James Walker Devol works with OEM and end user clients within the Oil & Gas industry, engineering alternative solutions to operational problems using advanced thermoplastic technology.

The resulting components are directly interchangeable with existing technology but offer improved performance in every aspect.

Providing a fully project managed ‘idea to operational’ service, we offer CAD design, modelling and rapid prototyping plus the complete manufacturing process in-house, from material production through casting, extrusion or moulding to the final machining.



Tiflex
Vibration attenuation and isolation

As a James Walker group company, Tiflex has over fifty years experience in the manufacture and distribution of a wide range of polymer based materials and components, specialising in the manufacture of products which are made from elastomers and cork elastomer composites.

The company's in-house research facilities are a centre of excellence for the development of solutions to eliminate vibration and sound transmission

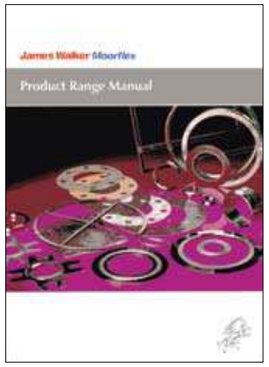
James Walker Townson
Custom expansion joint service

Our focus is on optimising the life and performance of expansion joint technology.

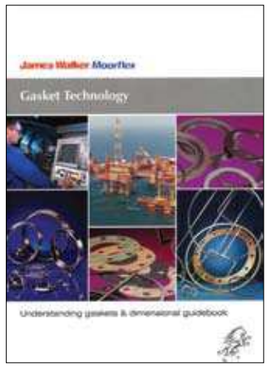
From on-site thermographic surveying through design, materials selection and testing to manufacture, our design engineers and production teams ensure that our field installation engineers will be installing a bespoke solution that will exceed performance and reliability expectations, whatever the location or operational conditions.

James Walker Moorflex

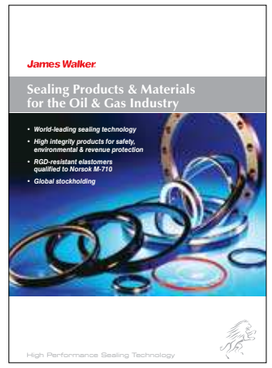
Technical guides



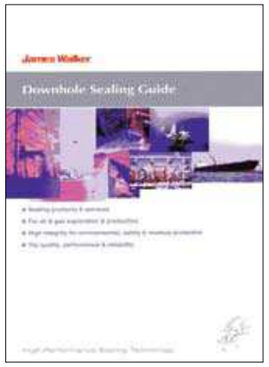
Product range manual



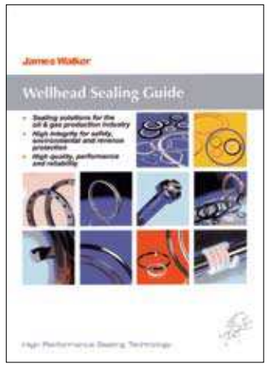
Gasket technology guide



Oil & gas guide



Downhole sealing guide



Wellhead sealing guide

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