Service and Technologies for Process Industries

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As an innovative industry leader in rotating equipment technologies and solutions, our extensive engineering expertise helps plants reduce maintenance costs, minimise downtime and enhance equipment reliability. Our comprehensive range of products and services, supported by a global network of service centres, helps keep your equipment running and supports sustainable operations by reducing energy consumption and minimising environmental impact.

Choose the solution that meets your unique needs, including:

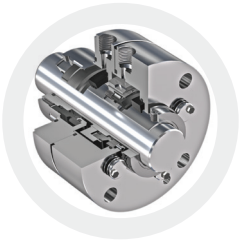
Advanced Duty Pump Seals

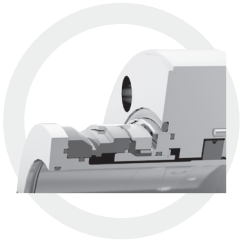
A range of mechanical seals for mission-critical applications, designed to solve the application-specific challenges of each industry. From API 682 compliance for the oil and gas industries, using gas seal technology on our innovative pump gas seals to eliminate fugitive emissions, to the difficulties associated with maintenance on water service and slurry pumps and rotating equipment.

Split Seals

	Type 37FS/37FSB	Type 3740/3740XL/3740D
Description	Type 37FS and Type 37FSB (balanced) fully split seals provide easy mounting and reduced maintenance downtime for sealing equipment. Type 37FS is recommended primarily for use in heavy duty equipment and equipment with vibration or axial run-out. Type 37FSB is recommended for higher pressure applications. Both the Type 37FS and the Type 37FSB provide the industry's only non-pusher split seal which eliminates the o-ring secondary seal and uses a robust single convolution bellows.	Type 3740 Series is a fully split, balanced, OD-pressurised, O-ring pusher seal designed for use on pumps, mixers, agitators and various other equipment. A fully split design allows installation or repair of the seal without disassembly of the equipment. The incorporation of preassembled rotating and stationary sub-assembly halves simplifies installation.
Temperature	Up to 180°F/82°C	3740/3740XL: Up to 250°F/121°C 3740D: Up to 275°F/135°C
Pressure	37FS: Up to 80 psig/5.5 barg 37FSB: Up to 200 psig/14 barg	3740: Up to 300 psig/20.7 barg continuously, with pressure excursions up to 450 psig/31 barg 3740XL: Up to 200 psig/14 barg 3740D: Up to 80 psig/5.5 barg
Speed	Up to 1,800 rpm	3740/3740XL: 3,500 fpm/17.8 $m \cdot s^{-1}$ 3740D: 400 fpm/2 $m \cdot s^{-1}$
Standard Materials	Carbon, silicon carbide, alloy K-500, 316SS nitrile, ethylene propylene	Carbon, silicon carbide, ceramic, 316SS, fluorocarbon, ethylene propylene
Applications	• Chemicals • Light slurries • Marine • Paper stock • Water and wastewater	• Chemicals • Light slurries • Marine • Paper stock • Water and wastewater

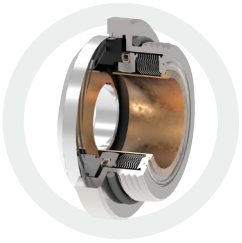
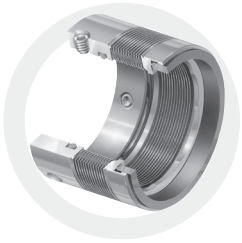
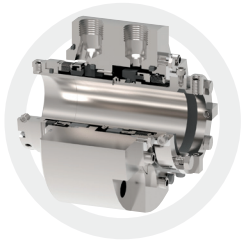
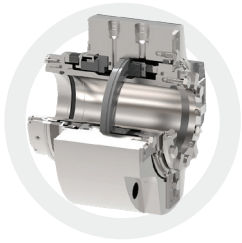
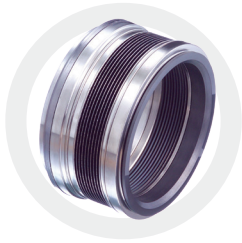
Hydrocarbon and High Duty Seals





	Type 1648/2648/3648	Type 8648VRS	Type 8610/8620
Description	Type 1648, Type 2648 and Type 3648 are API 682, 4th edition qualified Family A seals for use in general petroleum services. These are dependable, engineered mechanical seals developed typically to control emissions of light hydrocarbons and VOCs to less than 1,000 ppm. Type 1648 is a single cartridge seal designed to provide low emissions/ leakage for most refinery applications. Type 2648 is a dual unpressurised cartridge seal designed to provide additional safety for hazardous applications and those where the sealing environment needs to be controlled. Type 3648 is a dual pressurised cartridge seal designed for maximum containment of hazardous fluids and light hydrocarbons. The inboard seal is double balanced to provide a positive A seal with pressure from either direction.	Type 8648VRS is a standardised non-pusher elastomer mechanical seal which uses unique secondary seal technology, designed specifically for difficult crude oil pipeline applications, with a focus on meeting the demanding requirements of pipeline pumping station duties. It is available as a single, dual pressurised or dual unpressurised arrangement.	Type 8610 and Type 8620 are high duty seals, available in single and dual arrangements for the most extreme pressures and speeds. Unique patented seal face design ensures stable and predictable operation across a wide pressure range, including resistance to high reverse pressure scenarios. Ideally suited for pipeline, offshore and injection duties.
Temperature	-40° to 500°F/-40° to 260°C	-4° to 400°F/-20° to 204°C	-40° to 300°F/-40° to 150°C
Pressure	Up to 1,000 psig/69 barg	1,450 psig/100 barg depending upon size and design	Vacuum to 2,900 psig/200 barg
Speed	Up to 5,000 fpm/25 $m \cdot s^{-1}$	Up to 5,000 fpm/25 $m \cdot s^{-1}$	Up to 10,000 fpm/50 $m \cdot s^{-1}$
Applications	• Petroleum services • API compliant	• Liquid hydrocarbon pipeline	• High pressure pipeline • Injection duties

Metal Bellows

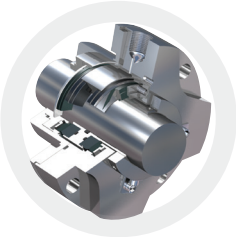
	Type 285	Type 670/676/680	Type ECS®	Type 2874HTC	Type 604HTC/609HTC
Description	Type 285 seal is the first non-contacting, specially designed welded metal bellows seal to be applied to the toughest cryogenic applications. Type 285's compact design fits the most popular cryogenic pumps without modification: both site-based and road tanker pumps. It is available in various seal cartridge arrangements: flanged and left- or right-hand threaded. The design and construction material meet the industry safety requirements, allowing Type 285 to seal common industrial liquid gases including oxygen, nitrogen and argon.	Robust low temperature edge-welded metal bellows seals. Available in various metallurgy including alloy C-276 in Type 670 for corrosive applications.	Dry-running metal bellows seal used for emission containment and for safety/back-up of the primary seal. Available in low and high temperature versions. It is supplied in the outboard position of a dual/tandem cartridge assembly.	Non-contacting, non-elastomer dual gas seal for high temperature applications. API 682 qualified. Piping Plan 74 is used to supply an inert gas to the seal for zero emissions. The seal is pressure balanced to ensure full reverse pressure containment capability. Metal bellows with HTC technology and inert graphite secondary seals.	Type HTC high-temperature, corrosion-resistant, welded metal bellows seals are a unique advanced technology for reliably sealing fluids in harsh high temperature corrosive environments. They also provide superior face stability at elevated temperatures. Available with double-ply bellows for higher pressure applications.
Temperature	-320°F/-196°C to ambient	-100° to 550°F/-75° to 290°C (depending on materials used)	Low-temperature option: Up to 400°F/204°C High-temperature option: Up to 800°F/425°C	-100° to 800°F/-75° to 425°C	-100° to 800°F/-75° to 425°C
Pressure	Up to 100 psig/7 barg	Vacuum to 360 psig/ 25 barg	Dynamic containment (wet): Up to 300 psig/20.7 barg Static containment (wet and dry): Up to 450 psig/31 barg Dynamic containment (dry): Up to 15 psig/1 barg	Vacuum to 232 psig/16 barg barrier pressure	Dynamic: Vacuum to 300 psig/20.7 barg Static: 450 psig/31 barg
Speed	Up to 10,000 rpm	Up to 5,000 fpm/25 $m \cdot s^{-1}$	Up to 5,000 fpm/25 $m \cdot s^{-1}$	1,450 to 3,600 rpm	Type 604HTC: Up to 10,000 fpm/50 $m \cdot s^{-1}$ Type 609HTC: Up to 5,000 fpm/25 $m \cdot s^{-1}$
Applications	• Cryogenic liquified gases	• Oil and gas • Chemical • General industry • Refrigeration compressor (Type 680 only)	• Oil and gas • Chemical • Petrochemical	• Oil and gas • Chemical • Petrochemical	• Oil and gas • Chemical • Petrochemical

Slurry Seals

	Type 5840	Type 5860	Type 5870
Description	Type 5840 is a single cartridge seal that includes many of the advantages associated with heavy duty seal design assembled into a cost effective package for the volume requirements associated with general mineral processing duties. It is manufactured from materials resistant to abrasive and/or chemical attack, to provide long service life in hostile environments. The absence of dynamic secondary seals means that there is no shaft fretting or damage and no hang-up of primary seal faces.	Type 5860 is a ruggedly constructed, OD-pressurised, single O-ring pusher slurry seal designed specifically for use in heavy duty slurry pumps, mixers and other rotating equipment for the mining and mineral industries where heavy ore slurries are processed. Replaceable, hard alloy assemblies are used for economical repair.	Type 5870 is a single, balanced O-ring pusher cartridge designed for operation without a flush in paper stock and light duty slurry pumps, mixers and other rotating equipment.
Temperature	Without water quench: Up to 167°F/75°C With water quench: Up to 248°F/120°C	Without water quench: -40° to 180°F/-40° to 82°C With water quench: -40° to 400°F/-40° to 204°C	-40° to 300°F/-40° to 150°C
Pressure	Up to 305 psig/21 barg, subject to size	Full vacuum to 435 psig/30 barg	Full vacuum to 305 psig/21 barg
Speed	3,000 fpm/15 $m \cdot s^{-1}$	4,000 fpm/20 $m \cdot s^{-1}$	2,200 fpm/11 $m \cdot s^{-1}$
Applications	• General mining • Minerals processing	• General and heavy duty mining • Minerals processing	• General slurries • Paper stock

Spiral-grooved, Gas-lubricated, Non-contacting Cartridge Seals





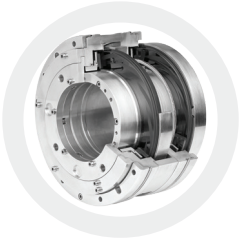

	Type 2800	Type 2800E/2800EX	Type 2800XP	Type 2874
Description	Type 2800 is for Maximum Achievable Control Technology (MACT) compliance in new and existing pumps. For high-reliability sealing of volatile fluids in chemical and petrochemical processes. Dry running, spiral grooved, non-contacting, dual pressurised cartridge seal for hazardous fluids, high purity, or temperature sensitive fluids.	Type 2800E is a state-of-the-art gas-lubricated, non-contacting, dual-pressurised seal cartridge for use in ANSI or DIN standard bore pumps or limited space applications. It provides zero emissions operation, extended seal life, reduced power consumption and elimination of wet seal lubrication system. Non-contacting, dry-running technology provides high-performance sealing of heat-sensitive or high-purity fluids. Type 2800EX is the solids-handling version of Type 2800E.	Type 2800XP is a high pressure version of Type 2800, specifically designed to deliver stable and reliable performance where high barrier pressures are required.	Type 2874 is a gas-lubricated dual seal that features both ID- and OD-pressurised faces in one factory assembled cartridge. Designed with outward pumping spiral grooves inboard to deal with dirty fluids and promote a liquid filled seal chamber to avoid de-watering conditions. Fits ANSI enlarged bore seal chambers but can be used in API seal chambers and adapted to a variety of constraints.
Temperature	-40° to 500°F/-40° to 260°C	-40° to 500°F/-40° to 260°C	-40°F to 500°F/-40°C to 260°C	-30° to 500°F/-34° to 260°C
Pressure	Up to 300 psi and 20 bar reverse pressure capabilities	Vacuum to 232 psig/16 barg reverse pressure capabilities	Up to 600 psig/41 barg reverse pressure capabilities	Vacuum to 435 psig/30 barg reverse pressure capabilities
Speed	1,450 to 3,600 rpm	1,450 to 3,600 rpm	1,000 to 3,600 rpm	1,450 to 3,600 rpm
Applications	• Chemical • Petrochemical • Refinery duties • Pharmaceutical • Food and beverage	• Chemical • Petrochemical • Refinery duties • Pharmaceutical • Food and beverage	• Chemical • Petrochemical • Oil • Pharmaceutical	• Dirty fluids • Chemical • Petrochemical • Oil • Pharmaceutical

Gas Seals | Separation Seals | Gas Panels , Seal Gas Booster and Seal Gas Recovery

Dry-running, non-contacting gas seals have been the industry standard since the early 1980s for turbomachinery. John Crane gas seals, separation seals and support, monitoring, control and conditioning systems — the heart of any reliable sealing solution — are constantly evolving to meet the needs of customers. The product portfolio is supported by global service capability providing repair, retrofit, gas seal storage and reliability expertise, delivering total solutions throughout the product lifecycle.

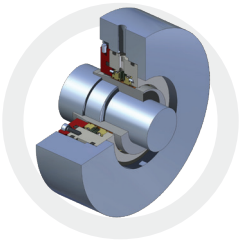
Gas Seals

	Aura® 220/120NS
Description	Aura 220 is the latest offering that delivers the benefits of gas seal technology, using a patented polymeric sealing device to help reduce operational and transactional costs.
Temperature Limits	-58° to 392°F/-50° to 200°C
Pressure	Up to 3,625 psig/250 barg
Speed	Up to 27,500 fpm/140 m·s^{-1}
Applications	• Upstream oil and gas • Midstream oil and gas • Downstream oil and gas • Petrochemical • Power generation • New Energy



	Type 28AT/28XP/28EXP
Description	These are non-contacting gas seals for turbo compressors and are available in single, tandem and double seal arrangements. Type 28AT and Type 28EXP help eliminate seal oil contamination and reduce maintenance costs and downtime. Type 28XP builds on the Type 28AT design and seals medium to high pressures with improved chemical resistance.
Temperature Limits	-220° to 600°F/-140° to 315°C
Pressure	Up to 6,500 psig/450 barg across single stage
Speed	Up to 39,400 fpm/200 m·s-1
Applications	• Upstream oil and gas • Midstream oil and gas • Downstream oil and gas • Petrochemical • Power generation • New Energy

Separation Seals



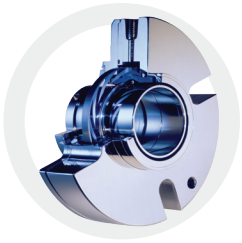
	Type 83	Type 93FR	Type 93LR
Description	Type 83 is a contacting carbon bushing designed to prevent the bearing oil migrating to the dry gas seal cartridge.	Type 93FR is a non-contacting carbon bushing designed to prevent the bearing oil migrating to the dry gas seal cartridge.	Type 93LR is a lift-off non-contacting carbon bushing designed to prevent the bearing oil migration to the dry gas seal cartridge.
Temperature Limits	-20° to 400°F/-30° to 204°C	-40° to 450°F/-40° to 230°C	-58°F to 392°F/-50°C to 200° C
Operating Pressure Range	3 to 14.5 psig/0.2 to 1 barg	0.73 to 7.3 psig/0.05 to 0.5 barg	1.5 to 7.3 psig/0.1 to 0.5 barg
Normal Operating Differential Pressure	4.4 to 7.3 psig/0.3 to 0.5 barg	0.73 to 1.5 psig/0.05 to 0.1 barg	1.5 to 4.4 psig/0.1 to 0.3 barg
Typical control methods	Pressure control	Pressure control and flow control	Pressure control and flow control
Speed	Up to 25,500 fpm/130 $m \cdot s^{-1}$	Up to 25,500 fpm/130 $m \cdot s^{-1}$	Up to 25,500 fpm/130 $m \cdot s^{-1}$
Applications	For all turbomachinery applications	For all turbomachinery applications	For all turbomachinery applications

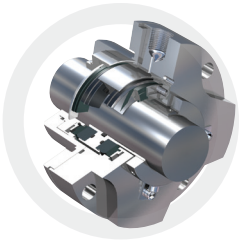
Gas Panels, Seal Gas Booster and Seal Gas Recovery

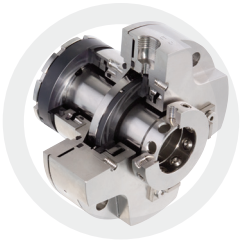
	Gas Panel	Seal Gas Booster	Seal Gas Recovery
Description	John Crane's dry gas seal support systems are designed and manufactured to condition, regulate seal gas supply, and monitor the performance of dry gas seals in compliance with oil and gas international standards and end-user specifications (API 692, ASME, ATEX/CE/PED, SQL, GOST, NORSOC, NEC and IEC). John Crane uses proprietary seal gas booster and filtration technology to achieve the requirements for seal gas conditioning for reliable operation. John Crane's gas seal support system portfolio provides solutions for energy transition and sustainability as gas seal support systems upgrades, centrifugal compressor oil seal replacement and seal gas recovery units.	The John Crane GCU Seal Gas Booster delivers differential pressure and gas flow across the seal faces to ensure the gas seals remain in optimum operational condition and equipment is always ready, allowing for trouble-free start-up, the first time and every time. Reliable dry gas seal performance is dependent on a constant supply of clean seal gas at a pressure above that of the process, but when the compressor is stationary, there is no pressure differential within the gas seal support system to ensure clean gas flow across the seal faces.	John Crane's Seal Gas Recovery (SGR) System is designed to work with tandem seal installations to recover seal leakage and divert the gas stream for more productive purposes. In tandem seal arrangements, seal gas leakage is routed to the flare line and burned as waste, resulting in emissions. The SGR System minimises the release of these emissions. In addition to positive environmental impacts, such as reducing greenhouse gas emissions, the SGR System cuts valuable product losses through the recovery and repurposing of high-cost process gas, helping to achieve annual cost savings by reuse through emission abatement and emission trading.

Vessel and Agitator Seals

In process industries such as chemical, pharmaceutical, pulp and paper, and food and beverage, maintaining compliance, preventing contamination and ensuring efficiency are crucial. Our range of vessel and agitator mechanical seals is designed to optimise equipment performance, preserve product purity and meet industry standards.





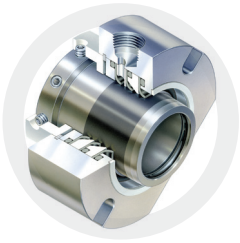


	Type 32 Series (Type 32, 32i, 32D, 32GL)	**Type CK Series** (Type CK725, CK726, CK728, CK736, CK738)	**Type 5280 Series** (Type 5280, 5281, 5282)	**Type 7800 Series** (Type 7828, 7848)
Description	Type 32 is a single, contacting dry-running, O-ring pusher component seal designed for pharmaceutical and chemical processing mixer applications. As no lubrication equipment is required, Type 32 seals are highly economic solutions. Type 32i features a unique noise reduction technology and Type 32D can be used on ATEX cat. 1 equipment without additional monitoring devices. Type 32GL is designed for corrosive mixer applications, specifically those found on glass-lined mixers and feature a composite sleeve. A dual back-to-back version can also be supplied.	Type CK Series vessel seals are dual cartridge seals for top entry vessel and agitator equipment. While their standard versions are compliant to vessel seal standard DIN 28138, adaptations to non-DIN equipment are possible on request. As required by DIN, type variants are available without or with integrated radial bearing, as well as those applicable to glass-lined equipment. Type CK725, Type CK726 and Type CK736 are compact units with unbalanced, liquid-lubricated seal faces for general duties. Contacting dry-running versions are available on request. Type CK728 and Type CK738 feature balanced faces for heavy duty conditions. Furthermore, both seal types are available as liquid-lubricated, contacting dry-running or non-contacting gas-lubricated design, the latter for high-purity applications in pharmaceutical industries. All CK seals are compliant with European ATEX legislation.	The first choice for ultra-clean pharmaceutical and biotech applications, these seals meet Qualified Hygienic Design (QHD) requirements to enable the cleaning and sterilization of the product-wetted parts with the seal in place (CIP, SIP). Different versions of Type 5280 Series are suitable for different vessel materials: Type 5280 for steel, Type 5281 for glass-lined and Type 5282 for special alloy vessels. Each type is available as liquid-lubricated, contacting dry-running or non-contacting gas-lubricated versions for high-purity applications. The special inboard seal design allows the application on top, side and bottom entry vessels. All versions are suitable for operation in potentially explosive atmospheres (ATEX cat. 1–3).	Type 7800 Series is a modular, dual-pressurised, back-to-back, O-ring pusher cartridge seal designed for mixer applications. Compact standard versions, including a bearing option, are available from 1 to 8 inches. Type 7848 is available as a liquid-lubricated or contacting dry-running version, whereas Type 7828 is a non-contacting gas-lubricated design for high-purity applications. Where reduced barrier gas consumption is desirable, Type 7828GD is a hybrid design that offers a combination of non-contacting dry-running seal faces inboard and contacting dry-running seal faces outboard.
Temperature	-40° to 300°F/-40° to 150°C	-40° to 392°F/-40° to 200°C	-40° to 392°F/-40° to 200°C	-40° to 500°F/-40° to 260°C
Pressure	Vacuum up to 220 psig/15 barg	Vacuum up to 360 psig/25 barg	Vacuum up to 87 psig/6 barg	Vacuum up to 290 psig/20 barg
Speed	Up to 400 fpm/2 $m \cdot s^{-1}$	Up to 400 fpm/2 $m \cdot s^{-1}$	Up to 400 fpm/2 $m \cdot s^{-1}$	Up to 400 fpm/2 $m \cdot s^{-1}$
Applications	Mixer and agitators in: • Chemical • Pharmaceutical • Biotech • Food processing • Petrochemical • General industry	Top entry mixer and agitators for DIN or non-DIN reaction vessels in: • Chemical and fine chemical • Pharmaceutical • Biotech • Food processing • Petrochemical • General industry	Top, side or bottom entry mixer and agitators for high-purity applications in: • Pharmaceutical • Biotech • Fine chemical	Mixer and agitators in: • Chemical • Pharmaceutical • Biotech • Food processing • Petrochemical • General industry

Accessories | General Elastomer Seals | Light and Standard Cartridge Seals |

Our mechanical seals, packing and bearing isolators blend cutting-edge technologies with industry expertise, resulting in products defined by innovative design and exceptional manufacturing quality. These solutions deliver reliable performance across many applications, while helping to reduce installation times and lower maintenance costs.

Accessories



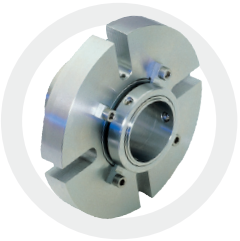
	Packing		Multiple Lip Seal (MLS)	Bearing Isolators
	Rotating Applications	Static/Valve Applications		
Description	Low-cost, braided sealing solution that combines a variety of materials, including aramids, PTFE, graphite, carbonaceous fibers and yarns for rotating pump and static valve applications.		Economic, engineered seal developed for low-speed, high-viscosity applications using graphite-filled PTFE lip seals.	Non-contacting bearing protection designed to preserve bearing lubricants, exclude contaminants and debris and eliminate shaft wear prolonging bearing life and reducing down time.
Temperature Limits	-400° to 850°F/ -240° to 455°C	Oxidizing: -400° to 850°F/-240° to 455°C Non-oxidizing: -400° to 4,500°F/ -240° to 2,500°C In steam: Up to 1,200°F/649°C	-200° to 325°F/-129° to 163°C	-40° to 400°F/-40° to 204°C
Pressure Limits	Up to 500 psig/34 barg	Up to 4,300 psig/296 barg	Up to 200 psig/13.8 barg	Up to 5 psig/0.34 barg
Speed Limits	Up to 4,000 fpm/20 $m \cdot s^{-1}$		Up to 900 fpm/4.5 $m \cdot s^{-1}$	Up to 15,000 fpm/76.2 $m \cdot s^{-1}$
pH	pH: 0 to 14		—	—
Applications	For many water-based applications such as: • Water and wastewater • Food and beverage • Mining • Pulp and paper • Chemical • Oil and gas • Power generation • General industry		• Water and wastewater • Food and beverage • Mining • Chemical • General industry	• Water and wastewater • Mining • Pulp and paper • Power generation • General industry

General Elastomer Seals




	Type 1 / 2	Type 21	Type 2100 / 2106	Type 6 / 6A
Description	These are multi-purpose nonpusher elastomer bellows seals for industrial applications. Designs are available in single, double and balanced arrangements. The bellows technology is available as a cartridge in Type 5611 seal range. Incorporating a spring adapter creates a low profile, enabling it to fit small cross section stuffing boxes. The seal head is self-aligning, automatically adjusting for abnormal shaft endplay run-out, primary ring wear and equipment tolerances.	Our general-purpose Type 21 mechanical seal has become the industry standard for OEM designers. Automatic adjustment compensates for abnormal shaft-end play, run-out, primary ring wear and equipment tolerances.	A compact, single spring elastomer bellows mechanical seal. The unitised design makes them easy to fit. Large flexibility makes them ideal for shafts with axial play and run-outs. Positive key drive protects bellows from torsional strain.	Type 6 / 6A are compact unitised, single spring, elastomer bellows mechanical seals. Some are suitable for shafts with large misalignments and run-outs.
Temperature Limits	Up to 400˚F / +205˚C	-40˚F to +400˚F / -40˚C to +205˚C	2106: -20˚F to +300˚F / -30˚C to +150˚C 2100: -40˚F to +300˚F / -40˚C to +150˚C	-40˚F to +400˚F / -40˚C to +205˚C
Pressure Limits	Standard: Up to 29 barg / 420 psig Balanced version: Up to 82 barg / 1,200 psig	Up to 11 barg / 150 psig	2106: Up to 10 barg / 150 psig 2100: Up to 20 barg / 290 psig	ID: 0.5 brag / 7.2 psig OD: 5 barg / up to 75 psig
Speed Limits	Up to 2500 fpm / 13 m/s	Up to 2500 fpm / 13 m/s	2106: Up to 2500 fpm / 13 m/s 2100: Up to 3,000 fpm/15 m·s-1	6: Up to 1000 fpm / 5m/s Up to 3600 RPM 6A: Up to 2500 fpm / 13 m/s Up to 10,000 RPM
Applications	• Food processing • Gas • Marine • Offshore • Paint and ink • Power generations • Pulp and paper • Water and wastewater • Chemical processing	• Water and wastewater • Pulp and paper • Food processing • Pool and spa • General applications	• Water and wastewater • Pulp and paper • Food processing • Marine • Pool and spa • Industrial, commercial and residential water systems • Heating and cooling • General applications	• Pool and spa • Industrial, commercial and residential water systems • Heating and cooling

Light and Standard Cartridge Seals



	Type 4600 Series (Type 4610, 4615, 4620P)	Type 5600 Series (Type 5610, 5610D, 5610Q, 5610V, 5610VQ, 5611, 5615, 5620, 5620-USP, 5620D, 5620P, 5620VP, 5625)	Type SB1/SBW/SB2/ SB2-USP
Description	The best-value, high-quality, easiest-to-fit O-ring cartridge seal for general industry applications. Hydraulically balanced with non-clogging wave spring. Available in single (Type 4610 and Type 4615) or double (Type 4620P) arrangements for DIN pumps. Compact cartridge design with unique centralising ring.	Type 5600 is a series of universal cartridge seals. Designed to fit standard ANSI and DIN pumps, the product series utilises a foundation of common adaptive hardware with interchangeable elastomer bellows, O-ring pusher and metal bellows seal heads in both single and dual arrangements. The modular cartridge design concept provides maximum flexibility in a product line which can be tailored to suit the application.	Specially designed for demanding applications, these easy-to-install mechanical seal cartridges are available in single or dual arrangements. Suitable for various process fluids. The design accommodates high axial movement.
Temperature Limits	266°F/130°C	-20° to 400°F/-30° to 204°C	-4° to 350°F/-20° to 180°C
Pressure Limits	Up to 220 psig/15 barg	Up to 305 psig/21 barg	Up to 220 psig/15 barg
Speed Limits	Up to 3,600 rpm	1,800 to 3,600 rpm	Up to 4,000 fpm/20 $m \cdot s^{-1}$
Applications	• Water and wastewater • Power generation • Chemical • General purpose industry Some variants of the 4600 seal approved for drinking water applications	• Chemical • Petrochemical • Power and water • Pharmaceutical • General industry • Food processing • Mining 5600 seal NSF-61 approved for drinking water applications	• Pulp and paper • Chemical • Power generation • Water and wastewater • General industry • Mining

API/Engineered Wet Seal Support Systems | ANSI/DIN Pump Seal Support Systems

Achieve the ideal operating conditions for exceptional seal performance and reliability. Our extensive selection of engineered pressure reservoirs, gas seal control panels, heat exchangers and abrasive separators can be tailored to create the perfect seal support system for any application.

API/Engineered Wet Seal Support Systems

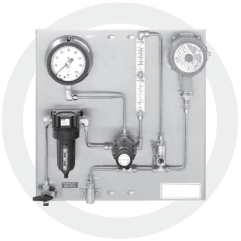
	PR 52/53A and PA 53B	PL 54/55	PG 72/74	WCV/WCH
Description	These reservoir-based seal support systems are designed for API Plan 52/53A and 53B applications to support unpressurised and pressurised dual seals. Circulation to buffer or barrier fluid is achieved with a pumping ring (or optional circulating pump). A range of heat exchangers can be packaged with this system.	PL 54/55 lubrication systems provide a positive flow and pressure of pressurised or unpressurised barrier/buffer fluid to dual seals. This seal support system type is typically preferred where flow and heat removal capacity exceeds that of API Plan 52 or 53 seal support systems.	PG 72/74 systems are used to provide a clean, regulated gas supply to either a dual unpressurised or pressurised seal arrangement. A gas, typically nitrogen, is introduced in the area between the inner and outer seals, thus preventing fugitive emissions from escaping to the atmosphere.	These water-cooled heat exchangers, either vertical or horizontal configurations, may be applied where water is readily available and may be packaged together with seal support systems when additional cooling is needed.
Temperature	-10°C (14°F) to 100°C (212°F)	—	-18°C (0°F) to 60°C (140°F)	-10°C (14°F) to 300°C (572°F)
Pressure	PR 52/53A: 40 barg / 600psig PA 53B: Up to 200 barg (3000psig)	206 barg / 3,000 psig	16 barg / 230 psig	Product/Barrier/Buffer Design Pressure: 200 barg / 3000 psig Coolant Design Pressure: 16 barg (232 psig)
Capacity	PR 52/53A Reservoir sizes:12 and 20 L/ 3 and 2 U.S. gal PA 53B Accumulator sizes: 10 to 50 L/ 2.5 to 15 U.S. gal	10, 20 or 30 U.S. gal 50, 80 or 120 L	—	—
Flow	—	20 lpm / 4.5 gpm	—	—
Standard Materials	PR 52/53A Reservoirs: 316/L stainless steel PA 53B Accumulators: Cr. molybdenum. 316 stainless steel optional	Tank: 304 stainless Tubing/Piping: 316/L stainless	Panel: 304 stainless steel Piping: 316/L stainless steel	Carbon steel Tubing/Piping: 316/L stainless steel
Applications	• Oil and gas • Petrochemical	• Oil and gas • Petrochemical	• Oil and gas • Petrochemical	• Oil and gas • Petrochemical

The specifications above reflect our standard scope. John Crane is renowned for its expertise and capability in delivering engineered systems that go beyond these published parameters.

ANSI/DIN Pump Seal Support Systems



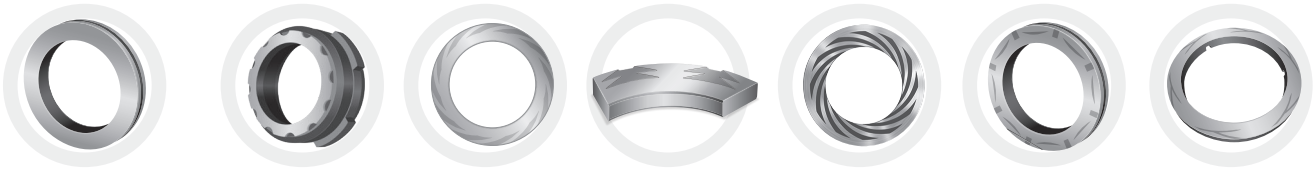




	GR1/1C and GR2/2C	Safeunit™ and Safeunit™ Ultima	ABC	Cyclone Separator	Control Panel Type 2800
Description	These stainless steel vessels (without or with internal cooling coil) are designed for general industry applications and provide buffer/barrier fluid to a dual-seal arrangement.	Safeunit™ and Safeunit™ Ultima are specially designed to control seal water flow and pressure in extreme conditions. This makes it ideal for the extreme applications found in pulp, paper and chemical industry processes, plus a wide variety of mining and general industrial uses.	Air-cooled heat exchangers may be applied when water is not available, or required heat removal can be achieved with an air-cooled heat exchanger. Air-cooled heat exchangers are available in a range of finned tube designs, including electrically-driven air blast models.	Cyclone separators (API Plan 31) are incorporated in the flush line from discharge of the pump. This separator does not require cleaning and is designed to remove solids, providing a clean flush stream back to seal chamber.	Simple gas control panel suitable for all Type 2800 and Type 2874 seals.
Temperature	—	212°F/100°C	—	Up to 600°F/315°C	-40° to 500°F/ -40° to 260°C
Pressure	GR1/1C: 16.3 barg / 236 psig GR2/2C: 30 barg / 435 psig	Up to 50 barg / 725 psig	—	Up to 206 barg / 3,000 psig	Up to 41 barg / 600 psig
Capacity	GR1/1C: 8L / 2.2 U.S.gal GR2/2C: 7.5L / 2.2 U.S.gal	—	—	—	—
Flow	—	up to 15 lpm / 3.3 gpm	—	—	—
Standard Materials	316/L stainless steel Level gauge: Aluminium body, Buna O-ring (GR1) weld pad, cs cover, stainless steel wetted parts (GR2) Tube and fittings: 316/L stainless steel Cooling coil: 316/L stainless steel (GR1C/2C only)	—	Tubing: 316/L stainless steel Tension wrap fins: 304 stainless steel Fan: galvanised steel or aluminium Base and frame: 304 stainless steel	316 stainless steel	—
Applications	• Chemical • Pharmaceutical • General industry	• Chemical • Pharmaceutical • General industry • Pulp and paper • Mining	• Chemical • Pharmaceutical • General industry	• Chemical • Pharmaceutical • General industry where solids may be present	• Chemical • Petrochemical • Oil • Pharmaceutical

Seal Face Treatments

Designed to overcome rigorous challenges, our comprehensive suite of seal face technologies combat limited seal face lubrication that adversely affects reliability, cost and durability. Our engineers designed these face treatments to extend rotating equipment life through advanced micro machined patterns and features improving seal face lubrication that optimises equipment performance. We deliver the right face technology for the right application.



	John Crane Diamond®*	Hydropads	Standard Spiral Groove for Gas	Bidirectional Groove for Gas	Up-Stream Pumping for Liquids	Laserface	Y Grooves
What it Does	Leverages diamond's unparalleled properties of hardness, thermal conductivity and low friction to enhance mechanical seal performance, delivering superior reliability and reducing operating costs.	Enhance seal interface cooling, promoting lubrication in low-lubricity services.	Promotes hydrodynamic lift to minimise face generated heat and enhance lubricity in poor lubricity conditions.	Promotes hydrodynamic lift to minimise face generated heat and enhance lubricity in poor lubricity conditions.	Delivers dual-pressurised seal benefits without the support system complexity, isolating face lubrication and process fluid.	Provides active control of the sealing interface, augmenting face lubrication while minimising frictional heat generation and leakage.	Enhances fluid film formation in high speed applications.
Where Used	John Crane Diamond® is valuable in nearly every fluid processing industry. If you're using pumps, John Crane Diamond can likely enhance your operations today—especially in applications involving abrasive slurries, poorly lubricating fluids, intermittent dry running or where reducing energy consumption, cooling water usage and carbon footprint is critical.	Turbo and non-turbo compressors, process pumps, general process pumps in HPI/CPI processing viscous fluids that have difficulty generating fluid film.	Compressors, pumps and equipment pumping supercritical fluids such as CO_2, ethane, ethylene and mixtures of these. Turbo and non-turbo compressors, process pumps, general process pumps in HPI/CPI.	Turbo and non-turbo compressors, process pumps, general process pumps in HPI/CPI.	Pulp and paper solids processing, high- pressure water injection pumps, process pumps and general process pumps in HPI/CPI.	Applications with a high-pressure temp margin close to boiling point where cooling flow is limited, such as hydrocarbons methane, ethane, propane, NGLs and non-hydrocarbon applications.	Any compressors where spiral groove technology not used.
Problem Solved	Intermittent dry running episodes, poor lubricating conditions and high abrasion rates leading to excessive leakage and water waste.	Poor lubrication causing higher heat generation and friction leading to increased seal wear.	Friction caused by poor lubrication leads to premature seal wear causing a reduction in seal life.	Friction caused by poor lubrication leads to premature seal wear causing a reduction in seal life.	High heat generation, abrasion and barrier system complexities.	Poor lubrication leads to higher heat generation, causing increased friction in applications with volatile fluids or fluids close to their boiling point.	High-speed oil applications that experience high seal face leakage.
Benefits	Reduces life cycle and operating costs through enhanced reliability, extended mean time between failures (MTBF) and lower operational demands, including reduced energy consumption and minimal cooling water usage.	Minimised frictional heat generation and wear, extended PV capability over standard plain face seal, improved seal life, higher operational limits.	Minimal power consumption, no heat generation, extended seal life.	Minimal power consumption, no heat generation, extended seal life, simplified support systems, tolerates CW and CWW rotation, plus simplified installation and minimised inventory for double ended pumps.	No wear, easy to install and simple support system, reliable — simple barrier system.	Reduced friction, allows operation of single seal close to Saturated Vapor Pressure (SVP).	Low seal wear for longer life than conventional seal technology, lower barrier fluid consumption than standard plain face seal.

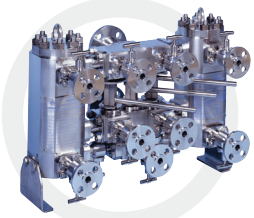
* John Crane finalised its purchase of the Industrial Division of Advanced Diamond Technologies (ADT) on April 17, 2019. ADT is a leader in the development and application of diamond films for industrial and mechanical applications.

Filtration Technologies

Our filtration solutions and technologies keep your operation running at peak performance and avoid the costly effect of contamination.

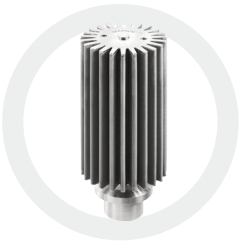
John Crane's Indufil® equipment filtration systems and elements can help extend the life and operational predictability of your critical rotating equipment in seal gas, fuel gas and liquid fuel, and liquid filtration applications.

John Crane's Seebach® products offer tailor-made designs with precision manufacturing, that outperforms competitor products with longer lifetime and more efficient performance. Our designs offer continuous process optimisation and innovation for challenging filtration applications in polymer, chemical, pharmaceutical and other process industries. We also have extensive computational fluid dynamics (CFD) experience for the simulation of fluid and media flow characteristics. Utilising the simulation process we can optimise existing systems or design new systems for specific applications, enabling upgraded filtration performance (longer onstream lifetimes, improved contaminant capture) for classical fluids such as gases and liquids, as well as non-Newtonian fluids such as polymers.



	Liquid Filtration	Seal Gas Filtration	Fuel Gas Filtration	John Crane's Indufiil® Filter Elements
Description	Liquid filters are typically used on all oil and water duties and can be applied to almost any liquid application. Duplex filters are recommended to ensure adequate filtration of the process flow while the filter element is changed.	Almost every centrifugal compressor uses dry gas seals to contain the high-pressure gas, whether it is on a high-pressure re-injection duty or on a low-pressure pipeline. Features include: Coalescing stages to remove liquids in the gas stream ensuring the gas is suitably dry double block and bleed arrangement.	Throughout the oil and gas and power generation industries, natural gas has become the preferred fuel for providing motive power. Effective filtration systems help ensure the demands of modern engines are met by providing clean, dry gas. Failure to provide this can quickly cause a reduction in efficiency or worse. John Crane's Indufil fuel gas filtration units are individually tailored to maximise reliability regardless of the supply gas.	The performance of a filter unit is entirely dependent on the elements fitted, making it essential to fit genuine John Crane Indufil® filter elements. Filter elements are available for liquid, seal gas and fuel gas applications with guaranteed performance levels and minimised pressure drop to maximise run time between change-outs and keep protecting your rotating equipment. Our high-quality filter elements eliminate contaminants down to, and below 1-micron fineness and are proven to exceed efficienciesof 99.9% on both particles and aerosols.
Temperature	-76° to 608°F/-60° to 320°C	-320° to 608°F/-196° to 320°C	-76° to 608°F/-60° to 320°C	Specified as per filter system.
Pressure	Up to 14,500 psig/1,000 barg	Up to 8,700 psig/600 barg	Up to 1,450 psig/100 barg	Specified as per filter system.
Performance	Down to 1 micron at 99.9% efficiency (ß ↗ 1,000) tested per ISO 16889.	Particle filtration down to sub-micron level at 99,9% efficiency (ß 1000) and liquid content down to 0.01 ppm, tested in accordance to ISO 12500.	Particle filtration down to sub-micron level at 99,9% efficiency (ß 1000) and liquid content down to 0.01 ppm, tested in accordance to ISO 12500.	Particle filtration down to submicron level at 99,9% efficiency (ß 1000) and liquid content down to 0.01 ppm, tested in accordance with ISO 12500 or ISO 16889.
Applications	• Lubrication fluids for rotating equipment • Liquid fuels and injection water for gas turbines	• Compressors • Turbo expanders	• Fuel conditioning for gas turbines	• Liquid filtration • Seal gas filtration • Fuel gas filtration

Filtration Technologies

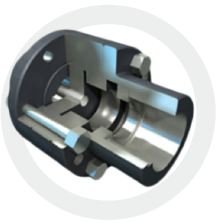


	Polymer Filtration	Filter Elements/Discs	Industrial Filtration
Description	Polymer melt filtration systems remove solid and soft (so called gel) particle contaminants during the polymerisation process and the production of final products. The polymer melt filters are designed based on proprietary CFD analysis. Filter discs, candles and mesh packs for replacement of existing filter in screen-changers and large area filters.	Filter discs, candles and mesh packs for replacement of existing filter parts used in any application or process. John Crane's Seebach filter discs and filter candles demonstrate improvements to all kind of filter systems. Used for liquid, gas and coalescer filtration. Used in all industries, such as polymer, pharmaceutical, chemical, and food and beverage. Optional removal mesh pack of any shape. Filter media: Mesh, metal fibre fleece, glass fibre, PE, PET and further materials on request.	**Food and Beverage** Stainless steel filter elements without dead zones enable compliance to hygiene standards and improve efficiency. **Chemicals** Purification of base chemicals, final products and product mixtures, as well as separation and recovery of catalysts, auxiliaries or solid products and powders.
Temperature	Up to 752°F/400°C (higher on request)	Up to 1,472°F/800°C (higher peaks allowed)	Up to 1,472°F/800°C
Pressure	Up to 4,350 psig/300 barg	Up to 7,250 psig/500 barg	Up to 13,054 psig/900 barg
Performance	↗ 100 m² filtration surface 2 to 100 micron filter rating ↖ 150 barg differential pressure	Filter rating: 1µm, 2µm, 3µm, 5µm, 10µm, 15µm, 20µm, 30µm, 40µm	Materials: Stainless steel, hastelloy, titanium, special alloy, glass fiber, PE, PET and further materials on request
Applications	• Polymer: Pellets, powders, chips, flakes such as PET, PC, PA, PBT, PMMA, PE • Compounding, e.g., pellets • Polymer forming: Films, sheets, casts • Recycling, e.g., PET	• Polymer filtration • Pharmaceutical • Chemicals • Food and beverage • Aerospace • Other industrial	• Food and beverage • Pharmaceutical • Fine chemicals: Purification, granulation, coating, drying, classification, false air and conveying

Couplings

Whether you need high-speed performance, high torque capacity, or long-term reliability, we offer couplings to meet every requirement. Designed with built-in safety features, our products help handle misalignment without compromising performance. Designed for infinite-life with no wearing parts, they will eliminate the need for lubrication, helping to lower the total cost of ownership.




	T and M Series	H Series	L series	C Series	A Series
Description	Metastream® T and M Series Couplings from John Crane incorporate stainless steel flexible membranes, providing a robust long-lasting design that can handle large amounts of torque while accommodating equipment misalignment. The coupling is manufactured as a cartridge unit making it easy to install, providing excellent inherent balance, built-in anti-fly feature and meeting standards API 610, ISO 13709, ISO 14691 IECEx and ATEX explosive atmosphere requirements.	Metastream® H Series from John Crane are a high-performance dry disc coupling offering the same benefits as T Series, but designed and manufactured to API-671 / ISO 10441 standard, for critical turbomachinery and high-duty pump applications. The range is certified to ATEX and IECEx for explosive atmospheres as standard, and couplings can be complimented with options ranging from exotic materials, electrical isolation, to torque limiting and live monitoring. Available in a variety of configurations including ultra-low moment for sensitive high speed equipment trains, H Series couplings ensure equipment durability, efficiency and extended life.	Metastream® L Series Couplings from John Crane incorporate stainless steel flexible membranes, providing a robust long-lasting design that can handle large amounts of torque while accommodating equipment misalignment. The coupling has unitised packs, overload collars, scalloped hubs to maximise bore capacity and meets IECEx and ATEX explosive atmosphere requirements.	MetaStream® C Series rigid couplings from John Crane are used on vertical pumps with no thrust bearing; they include radial pilots to insure repeatable concentric installation and external adjustment holes to easily set pump impeller lift. Available in various configurations for different shaft separations and to suit shafts with split ring grooves, external threads, or internal threads.	Powerstream® A Series elastomeric couplings from John Crane use a urethane insert that is resistant to most chemicals and oils, allowing it to be safely used on general industry pumps. Replacement of the insert can be done without moving the customer's equipment and the hub teeth are designed to have no metal-to-metal contact so that a motor test can be performed by simply removing the insert. Meets ATEX explosive atmosphere standards.
Continuous Torque	Up to 4,141,300 lbf in/467,950 Nm	Up to 5,131,910 lbf in/ 579,828 Nm	Up to 2,106,479 lbf in/ 238,000 Nm	Up to 1,363,320 lbf in/154,034 Nm	Up to 185,300 lbf in/20,936 Nm
Overload Torque	Up to 8,282,600 lbf in/ 935,900 Nm	Up to 8,724,251 lbf in/ 985,708 Nm	Up to 4, 212, 957 lbf in/ 476,000 Nm	Thrust loads up to 1, 565, 775 lbf in / 352,000 Nm	—
Speed Limits	Up to 25,000 rpm	Up to 37,700 rpm	Up to 14,000 rpm	Up to 5,000 rpm	Up to 9,600 rpm
Shaft Diameters	Up to 19.5"/580 mm	Up to 14"/350mm	Up to 13.62"/346 mm	Up to 10.5"/302 mm	Up to 7.5"/Up to 197 mm
Applications	• API pumps • API compressors	Turbomachinery: • Compressors • Turbines	• Industrial pumps • Industrial compressors	• Vertical pumps	• General industry pumps

The coupling types above are available in various material and design options to meet your specific equipment needs. Contact us today and speak to one of our experts about your application.

Services – At-A-Glance

John Crane offers a comprehensive suite of services and solutions designed to enhance the reliability of your rotating equipment and minimise operational downtime. Our approach goes beyond delivering exceptional products; we focus on building lasting partnerships, understanding your unique challenges and crafting tailored solutions to meet your specific needs..

Key Services:

Technical Field Services

- Installation, inspection, troubleshooting and repair of:
  - Mechanical seals and seal support systems.
  - Couplings.
  - Filtration systems.
- Supported by a global network of service engineers to deliver rapid response, expert support and improved safety.

Consultancy, Asset Condition Management and Turbomachinery Solutions

- Reliability engineering, maintenance engineering, condition monitoring, lubrication management and inventory management.
- Monitor, protect and optimise assets with innovative solutions like John Crane Sense® that digitally monitor asset health and performance in real time.
- Turbomachinery solutions include:
  - Upgrades and retrofits.
  - Repairs and health checks.
  - Project management to optimise production and achieve operational excellence.

Mechanical Seals Reliability Programs

- Provide high-level support to improve plant performance.
- Reduce operating costs through:
  - Defining measurable performance targets.
  - Assessing equipment reliability.
  - Analysing root cause failures.
  - Recommending tailored improvement strategies.

With expertise spanning diverse industries, John Crane proactively helps customers address operational challenges, improve production efficiency and maximise equipment uptime..

Solutions

Condition Monitoring

John Crane's condition monitoring services enable you to address potential problems before they can cause damage on your operations. In close collaboration with you, we implement effective condition monitoring programs aligned with your operating requirements. We analyse your assets across entire systems, using periodic monitoring and analysis of operational parameters for critical pieces of equipment to collect the real-time data needed to help increase production, reduce maintenance costs and lower total cost of ownership.

John Crane Sense®

Get ahead of failures before they happen with real-time, remote monitoring alerts that decrease the likelihood of unplanned shutdowns and reduce the possibility of lost production time. John Crane Sense® is the only technology offering a unique bundle of sensors embedded into a dry gas seal, monitoring conditions at the heart of the compressor without negatively impacting seal performance or life.

Alerts will notify you when conditions affect the asset's performance and the health of the dry gas seal so you can make informed, quick decisions to preempt failures. Other benefits include:

- Minimise unplanned shutdowns and reduce their duration.
- Efficiently plan for future turnarounds.
- Lower maintenance and reliability expenses.
- Enhance production capabilities.
- Reduce risk and adapt to fluctuating production demands.
- Support environmental efforts by decreasing process leaks.

Asset Management Solutions

John Crane Asset Management Solutions provides a complete asset roadmap, ensuring maximum uptime throughout the lifecycle of your mission-critical equipment. Utilising Condition Monitoring and data analysis, we create a Condition-based Maintenance strategy that ensures equipment is only serviced when necessary, maximising mean time between repair (MTBR), saving valuable resources and reducing costs.

Our Asset Management solutions can help:

- Improve production performance
- Reduce critical equipment repair costs and resources
- Mitigate risk

Turbomachinery Solutions

John Crane's Turbomachinery Solutions team is committed to maximising your operating compressor performance by providing a comprehensive range of on-site and analytical capabilities. Our solutions include:

- Integrated products and services
- Upgrade and retrofits
- Operational services
- Consultancy services
- Commissioning services
- Seal gas management program

Mechanical Seals Reliability Programs

John Crane's Mechanical Seals Reliability Programs provide the oil and gas, petrochemical and process industries with the high-level reliability support services, needed to improve plant performance and reduce inventory and operating costs. We bring our global experience to a local level, with our experts integrating seamlessly into your facility to implement a tailored, data-driven program.

Each program defines measurable performance targets and customer benefits, assesses equipment reliability, evaluates workforce skills and knowledge, analyzes the failure root cause and implements recommended strategies for improvement. Benefits include:

- Reduce your total cost of ownership (TCO)
- Increase mean time between repair
- Release capital locked up in inventory

Our expert team lets you focus on operational and corporate excellence while ensuring minimal equipment downtime.

Mechanical Seal Reliability Programs

John Crane's Mechanical Seals Reliability Programs provide the oil and gas, petrochemical and process industries with the high-level reliability support services they need to improve plant performance and reduce inventory and operating costs. Results-driven and individually tailored, each program defines measurable performance targets, assesses equipment reliability, analyses root cause failures and recommends strategies for improvement.

Gas Seal Management Program

Dry gas seals are critically engineered components which need to be stored properly to ensure they operate at an optimal level when installed.

With John Crane's Dry Gas Seal Management Program, we eliminate normal repair cycle times and ensure your spare seals are ready for shipment when needed. Reducing the time from weeks to hours ensures your equipment is back up and running with minimal disruption.

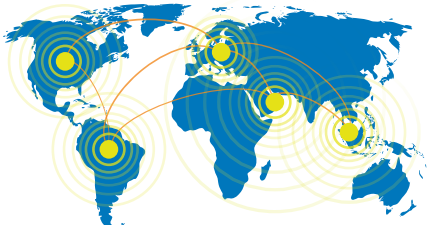
- Management and monitoring services for dry gas seals, to avoid unplanned costs and downtime
- Pro-active, scheduled health checks and testing, enabling on-demand seal availability
- Secure, humidity- and temperature-controlled facilities to ensure optimal seal storage
- Reducing the time from weeks to hours ensures your equipment is back up and running with minimal

Training

At John Crane, the safety, performance and reliability of energy services and industrial process plants are fundamentally linked to proper training. Our expertise lies in understanding the unique needs of our customers and tailoring our solutions to meet them as precisely and professionally as we can.

For gas and mechanical seals, we offer a broad range of training courses that blend hands-on practice with classroom instruction. These comprehensive courses equip engineers, technicians, operators and mechanics with the essential skills to correctly install, operate, and maintain equipment components. This ensures reduced downtime and the safe, smooth and reliable operation of their equipment.

Leverage the extensive knowledge of one of the industry's leading seal manufacturers—practical insights, delivered by professionals for professionals.



Global Service Network

- Over 200 facilities in more than 50 countries
- Close proximity to customers' operations
- Local service and expert global support

North America
United States of America
Tel: 1-847-967-2400
Fax: 1-847-967-3915

Europe
United Kingdom
Tel: 44-1753-224000
Fax: 44-1753-224224

Latin America
Brazil
Tel: 55-11-3371-2500
Fax: 55-11-3371-2599

Middle East & Africa
United Arab Emirates
Tel: 971-481-27800
Fax: 971-488-62830

Asia Pacific
Singapore
Tel: 65-6518-1800
Fax: 65-6518-1803

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bringing technology to life