john crane
a smiths company

Service and Technologies for Process Industries



Service and Technologies for Process Industries

Our world-class rotating equipment technologies, paired with an unmatched breadth of applied engineering expertise, helps plants reduce maintenance costs, slash down time and improve reliability. When it comes to keeping your rotational equipment running 24/7, John Crane's comprehensive range of products has you covered.*

Choose the application that meets your unique needs, including:

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**Can't find what you need? Contact your local sales representative for additional product options.*

ADVANCED DUTY PUMP SEALS

Split Seals | Hydrocarbon Seals | Metal Bellows | High Duty and Slurry Seals | Spiral-grooved, Gas-lubricated, Non-contacting Cartridge Seals

A range of 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, dealing with slurry in the mining and minerals processing industries, to the difficulties associated with maintenance on large pumps and rotating equipment — we have a solution.

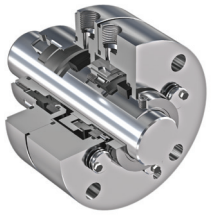
Split Seals

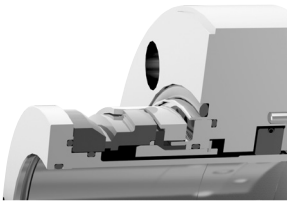




	Type 37FS/37FSB	Type 3740/3740XL/3740D
Description	Type 37FS and 37FSB (balanced) fully split seals provide easy mounting and reduced maintenance downtime for sealing equipment. Type 37FS is recommended primarily for use in heavy duty equipment and equipment with vibration or axial run-out. Type 37FSB is recommended for higher pressure applications.	Type 3740 Series is a fully split, outside-mounted, balanced, OD-pressurized, 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 Seals

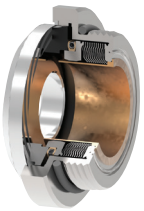


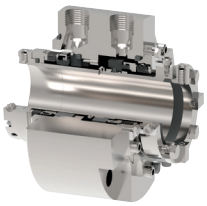




	Type 1648/2648/3648	Type 8648VRS	Type 8600
Description	Type 1648, 2648 and 3648 are API 682, 4th edition qualified Family A seals for use in general petroleum services. These are dependable, engineered mechanical seals developed typically to control emissions of light hydrocarbons and VOCs to less than 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 unpressurized 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 pressurized 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 standardized 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.	Type 8600 high duty seal range is 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 and injection duties. Can be supplied to international standards such as NACE MR-01-075.
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	• Crude oil pipeline	• High pressure pipeline • Injection duties

Metal Bellows







	Type 285	Type 670/676/680	Type ECS®	Type 2874NE	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 technology with inert graphite stationary secondary seals.	Type HTC high-temperature, corrosion-resistant, welded metal bellows seal is a unique advanced technology for reliably sealing fluids in harsh high temperature corrosive environments. It also provides 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

High Duty and Slurry Seals



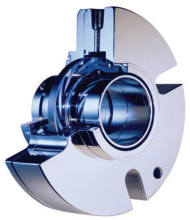


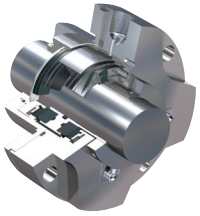


	Type 5840	Type 5860	Type 5870
Description	Type 5840 is a single cartridge seal that includes many of the advantages associated with heavy duty seal design assembled into a cost effective package for the volume requirements associated with general mineral processing duties. It is manufactured from materials 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-pressurized, 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. Dual pressurized seal alternative for positive sealing of high-purity fluids without potential for product contamination. ANSI and DIN large bore seal chambers.	Type 2800E is a state-of-the-art gas-lubricated, non-contacting, dual-pressurized 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-pressurized 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 305 psig/21 barg	Vacuum to 232 psig/16 barg	Up to 600 psig/41 barg	Vacuum to 435 psig/30 barg
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 COMPRESSION SOLUTIONS

Gas Seals | Separation Seals | Gas Panels

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 unrivaled global service capability providing repair, retrofit, gas seal storage and reliability expertise, delivering total solutions throughout the product lifecycle.

Gas Seals

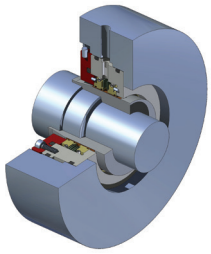


	Aura® 100/180/220/120NS
Description	The expanding Aura range represents the future of John Crane gas seal solutions. Aura 120NS is the latest offering delivering the benefits of gas seal technology in a compact, narrow section design.
Temperature Limits	-58° to 392°F/-50° to 200°C
Pressure	Up to 3,190 psig/220 barg
Speed	Up to 27,500 fpm/140 $m \cdot s^{-1}$
Applications	• Upstream oil and gas • Midstream oil and gas • Downstream oil and gas • Petrochemical • Power generation



	Type 28AT/28XP/28EXP
Description	The seal that changed an industry — the heritage Type 28 dry gas seal range from John Crane, with custom applications pushing the boundaries of what's possible. Still fully supported around the globe.
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 $m \cdot s^{-1}$
Applications	• Upstream oil and gas • Midstream oil and gas • Downstream oil and gas • Petrochemical • Power generation

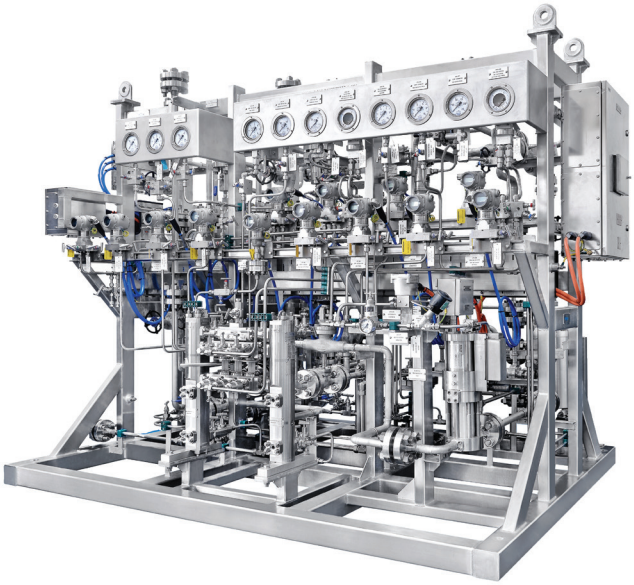
Separation Seals





	Type 83	Type 93FR
Description	Type 83 is a contacting carbon bushing designed to isolate the bearing oil from the dry gas seal cartridge.	Type 93FR is a non-contacting carbon bushing designed to protect dry gas seals from bearing oil ingress.
Temperature Limits	-20° to 400°F/-30° to 204°C	-40° to 450°F/-40° to 230°C
Operating Pressure Range	3 to 15 psig/0.2 to 1 barg	–
Maximum Separation Gas Operating Differential Pressure	–	7.5 psig/0.5 barg
Normal Separation Gas Supply Pressure	4 to 7.5 psig/0.3 to 0.5 barg	–
Recommended Separation Gas Operating Differential Pressure	–	0.75 to 1.5 psig/0.05 to 0.1 barg
Speed	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

Gas Panels

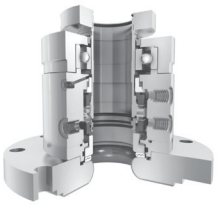


	Gas Seal Support Systems (Turbomachinery)
Description	John Crane's dry gas seal support systems are designed and manufactured for seal gas conditioning, controlled seal gas supply and performance monitoring of turbomachinery gas seals. John Crane's product portfolio ranges from general industry gas panels to highly engineered API 692 compliant modular designs. John Crane systems can be supplied in compliance with international standards and specifications such as API 692, ASME, ATEX/CE/PED, SQL, GOST, NEC and IEC.

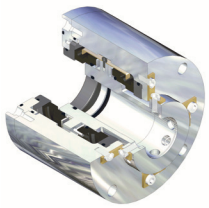
VESSEL AND AGITATOR TECHNOLOGIES

In industries like chemical, pharmaceutical, pulp and paper, and food and beverage, safeguarding and compliance with industry standards, avoiding contamination and efficiency are always top priorities. Our range of vessel and agitator seals optimize equipment performance, maintain product purity and conform to industry regulations, no matter where you are.









	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. Seal type CK725, CK726 and CK736 are compact units with unbalanced, liquid-lubricated seal faces for general duties. Contacting dry-running versions are available on request. Type CK728 and 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-pressurized, 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·s^{-1}	Up to 400 fpm/2 m·s^{-1}	Up to 400 fpm/2 m·s^{-1}	Up to 400 fpm/2 m·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

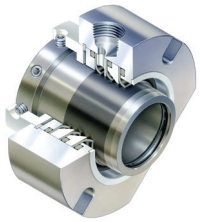
GENERAL ROTATING EQUIPMENT APPLICATIONS

Accessories | General Elastomer Seals | Light and Standard Cartridge Seals

Our range of mechanical seals, packing and bearing isolators combines advanced, thoroughly proven technologies with extensive industry expertise to create a range of products characterized by innovative design concepts and outstanding manufacturing quality. Tried, tested and effective solutions for virtually any application that deliver robust performance, reduced 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, and carbonaceous fibers and yarns for rotating pump and static valve applications.		Economic engineered seal developed for low-speed, high-viscosity applications using fluoro elastomer 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 150 psig/10 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









	Commercial OEM Seals	Type 2100	Type 502	Type 1/1A/1B/2/2B
Description	Simple mechanical seals, including Type 6, 6A, 21 and 2106, designed to serve the high volume machinery market. Some are suitable for shafts with large misalignments and run-outs. This is an economic solution ideal for general purpose applications.	A compact, single spring elastomer bellows. The unitized design makes it easy to fit. Design conforms to DIN 24960 and exists in three working lengths. Large flexibility makes it ideal for shafts with axial play and run-outs. Positive key drive protects bellows from torsional strain.	Type 502 is a full convolution elastomeric bellows seal designed for confined spaces and limited gland depths. Self aligning feature compensates for excessive shaft end-play and run-out.	These are multi-purpose non-pusher 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. Mechanical drive prevents shaft damage and eliminates overstressing of bellows. The seal head is self-aligning, automatically adjusting for abnormal shaft end-play run-out, primary ring wear and equipment tolerances. Non-clogging, single-coil spring is not affected by build-up of solids.
Temperature Limits	-40° to 350°F/-40° to 180°C	-40° to 300°F/-40° to 150°C	-40° to 400°F/-40° to 204°C	Up to 400°F/204°C depending on elastomer
Pressure Limits	Up to 150 psig/10 barg	Up to 290 psig/20 barg	Up to 580 psig/40 barg	• 1/1A/2: Up to 420 psig/29 barg • 1B/2B: Up to 1,200 psig/82 barg balanced version
Speed Limits	Up to 2,560 fpm/13 m•s^{-1}	Up to 3,000 fpm/15 m•s^{-1}	Up to 2,560 fpm/13 m•s^{-1}	Up to 2,560 fpm/13 m•s^{-1}
Applications	For many water-based applications such as: • Wastewater treatment • Chemical • Food processing • Other general applications including: – Swimming pools – Sump pumps – Jet pumps	For many water-based applications, such as: • Wastewater treatment • Pulp and paper • Food processing • Marine • General applications	• Chemical processing • Food processing • Gas • Marine • Offshore • Paint and ink • Power generations • Pulp and paper • Wastewater • Water systems	• Chemical processing • Food processing • Gas • Marine • Offshore • Paint and ink • Power generations • Pulp and paper • Wastewater • Water systems

Light and Standard Cartridge Seals









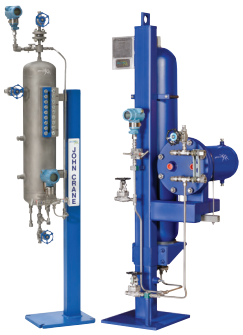
	Type 4111	Type 4600 Series (Type 4610, 4620P)	Type 5600 Series (Type 5610, 5610D, 5610Q, 5610V, 5610VQ, 5611, 5615, 5620, 5620D, 5620P, 5620VP, 5625)	Type SB1/SBW/SB2
Description	An entry level low-cost, general purpose cartridge-sealing solution for low-duty applications. Type 4111 uses proven sealing technologies and design features to provide reduced installation times and lower maintenance costs.	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) or double (Type 4620P) arrangement for DIN pumps. Compact cartridge design with unique centralizing ring.	Type 5600 is a series of universal cartridge seals. Designed to fit standard ANSI and DIN pumps, the product series utilizes 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	-40° to 225°F/-40° to 107°C	266°F/130°C	-20° to 400°F/-30° to 204°C	-4° to 350°F/-20° to 180°C
Pressure Limits	Up to 150 psig/10 barg	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	Up to 3,600 rpm	1,800 to 3,600 rpm	Up to 4,000 fpm/20 $m \cdot s^{-1}$
Applications	For many water-based applications such as: • Water and wastewater • Food and beverage • Mining • General industry	• Water treatment • Power generation • Chemical • Mining • Food processing • General purpose industry	• Chemical • Petrochemical • Power and water • Pharmaceutical	• Pulp and paper • Chemical • Power generation • Water and wastewater • General industry

SEAL SUPPORT SYSTEMS FOR PUMPS

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

Create the optimum operating environment that will ensure outstanding seal performance and reliability. Our comprehensive range of engineered pressure reservoirs, gas seal control panels, heat exchangers and abrasive separators can be combined to produce the perfect seal support system for any application.

API/Engineered Wet Seal Support Systems







	PR 52/53A & PA 53B	PL 54/55	PG 72/74	WCV/WCH	Control Panel Type 2800
Description	These reservoir-based seal support systems are designed for API Plan 52/53A and 53B applications to support unpressurized and pressurized 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 pressurized or unpressurized 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 unpressurized or pressurized 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.	Simple gas control panel suitable for all 2800/ 2874 seals.
Temperature	–	–	–	–	-40° to 500°F/-40° to 260°C
Pressure	–	3,000 psig/206 barg	–	–	Up to 600 psig/41 barg
Capacity	PR 52/53A Reservoir sizes: 3 and 2 U.S. gal/12 and 20 l PA 53B Accumulator sizes: 2.5 to 15 U.S. gal/10 to 50 l	10, 20 or 30 U.S. gal 50, 80 or 120 l	–	–	–
Flow	–	1.5 to 2.2 gpm/5.5 to 8 lpm	–	–	–
Standard Materials	PR 52/53A Reservoirs: 316/L stainless steel PA 53B Accumulators: Cr. molybdenum	–	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	• Chemical • Petrochemical • Oil • Pharmaceutical

ANSI/DIN Pump Seal Support Systems





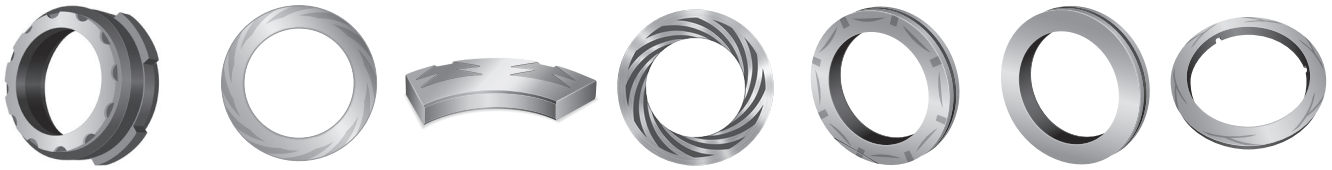




	GR1/1C and GR2/2C	Safeunit Ultima	ABC	Cyclone Separator
Description	These stainless steel vessels (without or with internal cooling coil) are designed for general industry applications and provide buffer/barrier fluid to a dual-seal arrangement.	Safeunit Ultima is specially designed to control seal water 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.
Temperature	–	212°F/100°C	–	Up to 600°F/315°C
Pressure	GR1/1C: 236 psig/16.3 barg GR2/2C: 435 psig/30 barg	90 to 150 psig/6 to 10 barg	–	Up to 3,000 psig/206 barg
Capacity	GR1/1C: 2.2 U.S. gal/8 l GR2/2C: 2 U.S. gal/7.5 l	–	–	–
Flow	–	0.75 gpm/3 lpm	–	–
Standard Materials	316/L stainless steel Level gauge: Aluminum 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: galvanized steel or aluminum 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

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 optimizes equipment performance. We deliver the right face technology for the right application.



	Hydropads	Standard Spiral Groove for Gas	Bidirectional Groove for Gas	Dynamic Lift Up-Stream Pumping for Liquids	Laserface	John Crane Diamond™*	Y Grooves
What it Does	Enhance seal interface cooling, promoting lubrication in low-lubricity services	Promotes hydrodynamic lift to minimize face generated heat and enhance lubricity in poor lubricity conditions	Promotes hydrodynamic lift to minimize face generated heat and enhance lubricity in poor lubricity conditions	Delivers dual-pressurized seal benefits without the support system complexity, isolating face lubrication and process fluid	Provides active control of the sealing interface, augmenting face lubrication while minimizing frictional heat generation and leakage	Improves the reliability of rotating equipment through diamond seal face coating to address intermittent dry running conditions	Enhances fluid film formation in high speed applications
Where Used	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	Electrostatic discharge (EDS) — typically associated with boiler feed applications, slurries and combi treatment plants	Any compressors where spiral groove technology not used
Problem Solved	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	Intermittent dry running episodes, poor lubricating conditions and high abrasion rates leading to excessive leakage and water waste	High-speed oil applications that experience high seal face leakage
Benefits	Minimized 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 minimized 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)	Reduced power consumption, reduced wear, extended MTBF and reduced lifecycle/operating costs	Low seal wear for longer life than conventional seal technology, lower barrier fluid consumption than standard plain face seal

**John Crane finalized 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.*

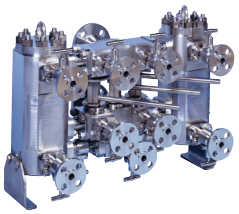
FILTRATION TECHNOLOGIES

Our filtration solutions and technologies, built on the globally-renowned reputation of the Indufil and Seebach brands, keep your operation running at peak performance and avoid the costly effect of contamination.

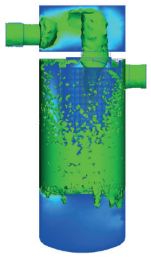
The Indufil brand for equipment filtration systems and elements can extend the life and operational predictability of your critical rotating equipment in seal gas, fuel gas and liquid fuel, and liquid filtration applications.

Seebach filter elements and filter systems have been made in Germany since 1970. All Seebach products use stainless steel, glass fiber and polymer filter media. We offer tailor-made designs with precision manufacturing, that outperforms competitor products with longer lifetime and more efficient performance. Our design offers continuous process optimization and innovation for challenging filtration applications in polymer, mining, chemical, food and beverage, aerospace and pharmaceutical industries.









	Liquid Filtration	Seal Gas Filtration	Fuel Gas Filtration	Simulation
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. Indufil fuel gas filtration units are individually tailored to maximize reliability regardless of the supply gas.	**Fluid Dynamic Analysis** Seebach has extensive experience in the simulation of fluid and media flow characteristics. Utilizing the simulation process we can optimize existing systems or design new systems optimized for specific applications. Seebach is upgrading elements and systems for classical fluids such as gases and liquids, and also for non classical fluids such as polymers and resins.
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	–
Pressure	Up to 14,500 psig/1,000 barg	Up to 8,700 psig/600 barg	Up to 1,450 psig/100 barg	–
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	Upgrade of filter performance (online time, filtration quality)
Applications	• Lubrication fluids for rotating equipment • Liquid fuels and injection water for gas turbines	• Compressors • Turbo expanders	• Fuel conditioning for gas turbines	• Gas • Liquid and coalescer filtration in all industries
Legacy Brand Logos	INDUFIL®	INDUFIL®	INDUFIL®	SEEBACH®

FILTRATION TECHNOLOGIES





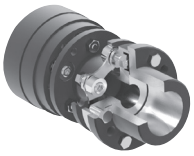
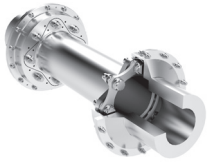
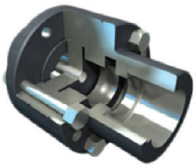
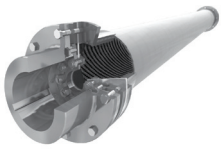
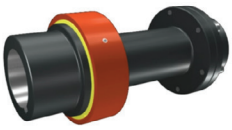




	Filter Elements/Discs	Polymer Filtration	Industrial Filtration	Mining Filtration
Description	Filter discs, candles and mesh packs for replacement of existing filter parts used in any application or process. Seebach filter discs and filter candles demonstrate improvements to all kind of filter systems. All products are exclusively designed and produced at Seebach. Used for liquid, gas and coalescer filtration. Used in all Industries, e.g., polymer, pharmaceutical, chemical, food and beverage Replacement of all brands e.g., Pall, Fuji, Purolator (Parker) Design pleated, plain, optional removal mesh pack of any shape Filter media: Mesh, metal fibre fleece, glass fibre, PE, PET and further materials on request	Polymer melt filtration systems remove solid and soft (so called gel) particle contaminants during the polymerization process and the production of final products. The polymer melt filters are designed based on proprietary CFD analysis. Seebach supports clients with dimensioning and customizing new filter systems and optimizing existing systems with new filter candles or filter discs. Filter discs, candles and mesh packs for replacement of existing filter parts in screenchangers and large area filters	**Pharmaceutical** Hygienic and safe production processes. Star-shaped CIP (clean in place) element protects product and environment and decreases product loss. **Food and Beverage** Stainless steel filter elements without dead zones enable compliance to hygiene standards and improve efficiency. **Aerospace** High demands on thermal, chemical and mechanical resistance and quality standards of operation **Chemicals** Purification of base chemicals, final products and product mixtures, as well as separation and recovery of catalysts, auxiliaries or solid products and powders	Underground mining machinery are operated hydraulically whereby filters remove contaminants from the fluid circuit. Filters in the high pressure water hydraulic and fresh water circuits need to be able to withstand high differential pressures and often include an automatic back-flush to clean the filter elements.
Temperature	Up to 1,472°F/800°C (higher peaks allowed)	Up to 752°F/400°C (higher on request)	Up to 1,472°F/800°C	32° to 176°F/0° to 80°C
Pressure	Up to 7,250 psig/500 barg	Up to 4,350 psig/300 barg	Up to 13,054 psig/900 barg	6,100 psig/420 barg max
Performance	Filter rating: 1µm, 2µm, 3µm, 5µm, 10µm, 15µm, 20µm, 30µm, 40µm	• ≥ 100 m² filtration surface • 2 to 100 micron filter rating • ≤150 barg differential pressure	Materials: Stainless steel, hastelloy, titanium, special alloy, glass fiber, PE, PET and further materials on request	• Maximum flow of 5.000 lpm • Automatic back flush • Down to 10 micron
Applications	• Polymer filtration • Pharmaceutical • Chemicals • Food and beverage • Aerospace • Other industrial	• 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	• Food and beverage • Pharmaceutical • Fine chemicals: Purification, granulation, coating, drying, classification, milling and sieving, false air and conveying	• Underground coal mining • High pressure • Water filtration • Return cycles • Last chance filters
Legacy Brand Logo	SEEBACH	SEEBACH	SEEBACH	SEEBACH

COUPLINGS

From safe, high speed and high torque capacity demands to proven, long and reliable life, we have a coupling to suit. Our products come with safety features built in and are proven to accommodate misalignment without loss of performance. Infinite life designs with no wearing parts that eliminate the need for lubrication, reducing total cost of ownership.

	T & M Series	H Series	C Series	Z series	A Series
Description	T & M Series Metastream couplings 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 and ATEX explosive atmosphere requirements.	High-performance lightweight Metastream H Series couplings 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, meeting standards API 671, ISO 10441 and ATEX explosive atmosphere requirements. It is also available in reduced moment versions that help increase equipment life.	C Series rigid couplings 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.	Metastream Z Series coupling combines the performance features of an M Series factory assembly stainless steel pack with an ultra-light composite tube spacer which has been designed for use in the humid atmosphere of cooling towers.	A Series elastomeric couplings 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.
Continuous Torque	Up to 4,142,149 lbf in/ 468,000 Nm	Up to 5,131,910 lbf in/ 579,828 Nm	Thrust loads up to 352,000 lbf/1,565,774 N	Up to 26,470 lbf in/ 2,991 Nm	Up to 185,865 lbf in/ 21,000 Nm
Overload Torque	Up to 8,284,298 lbf in/ 936,000 Nm	Up to 8,724,251 lbf in/ 985,708 Nm	–	–	–
Speed Limits	Up to 25,500 rpm	Up to 37,700 rpm	–	Up to 2,200 rpm	Up to 9,600 rpm
Shaft Diameters	Up to 21.5"/580 mm	Dependent on shaft length and engagement type	Up to 10.5"/302 mm	Up to 5.0"/130 mm	Up to 7.5"/213 mm
Applications	• API pumps • Compressors	Turbomachinery: • Compressors • Turbines	Vertical pumps	Cooling towers	General industry pumps
Legacy Brand Logos	METASTREAM™	METASTREAM™	METASTREAM™	METASTREAM™	POWERSTREAM

The coupling types above are available in various material and design options to meet your specific equipment needs; please contact your local John Crane office to discuss.

Services and Training

Services

Maintenance and Repair Services

To reduce unplanned maintenance and avoid unnecessary replacement costs, **John Crane Maintenance and Repair Services** oversees critical systems checks and plant equipment maintenance, as well as engineered component repair, removal and re-installation services. Assistance can be provided during unplanned shutdowns to get equipment back up and running quickly, or during planned maintenance to optimize your process and achieve your shutdown window.

On-site Field Services

Our experienced field teams are ready to get your critical equipment up and running. In specific geographies, John Crane offers on-call, on-site service support for installation and inspection, repair and troubleshooting of mechanical seals and support systems, couplings and filtration systems. Our global network of service experts are able to triage and respond to customers' most urgent needs. Services delivered onsite or in high-tech repair centers enable you to reduce costs and reduce downtime, while extending the lifecycle of mission-critical rotating equipment.

Service Benefits

- Quick response to urgent needs
- Expert support for seal installation, repair and troubleshooting
- Dedicated service engineers get mission-critical equipment back up and running
- Trained technical workforce on-site
- Reduced health and safety risks
- Less downtime increases productivity and efficiency
- Reduced costs and extended life expectancy of equipment





Turbomachinery Services

We understand that application downtime is inevitable, but it doesn't have to be immobilizing. Decades of turbomachinery experience enables John Crane to deliver services to your exacting requirements; supporting your projects by:

- Cutting overheads
- Reducing delays
- Minimizing unforeseen CAPEX

You can rely on John Crane to provide rotating equipment support whatever the role, size, or location of your plant; while globally-located turbomachinery service centers and 300+ engineers worldwide allow us to respond quickly to failure investigation and technical issues — anytime, anywhere.

Our Services

- **Upgrade and retrofit** – We can identify opportunities for application improvement, even in competitor equipment. Component upgrades, refurbishments and retrofits can enhance turbomachinery reliability and efficiency, and our turnkey solutions handle every aspect from initial review to final connections — including ongoing support.
- **Repair and test** – Our test rigs allow full dynamic testing under client-specific operating conditions in a wide range of environments. Customers can witness real-time testing data remotely, thereby speeding delivery and reducing average lead times for returning repaired components.

- **Consultancy and resolution** – Investment in rotating equipment needs to be conserved, so we offer solutions designed to bring your turbomachinery assets up to new standards. Performance restoration is a resource and cost-effective solution to extend the operating life of mature assets.
- **Project management** – We can project manage complete technology enhancements to improve specific aspects of equipment performance. Our team of experts will evaluate your equipment, diagnose and solve common operating challenges to deliver: increased efficiency, equipment life extension and emissions reduction.
- **On-site services** – Our Turbomachinery Services team are available on a contract or as-needed basis. Programmed and even reactive equipment health checks, can uncover potential problems early on, providing opportunities for corrective or preventative measures that could help maximize uptime and limit the need for unplanned maintenance.

Asset Management Solutions

John Crane Asset Management Solutions provides a complete asset roadmap, ensuring maximum uptime throughout the lifecycle of your mission critical equipment. Utilizing condition monitoring and data analysis, we create a condition based maintenance strategy that ensures equipment is only serviced when necessary, maximizing MTBR, saving valuable resources and reducing costs.

We are your reliability partner for operational excellence and industrial compliance.

Our Asset Management strategy can help:

- **Improve production performance**
  Reduction in service intervals means less interruption to production, making meeting the demands of your customer the key objective
- **Reduce critical equipment repair cost and resource**
  Less time spent focusing maintenance teams on unplanned downtime allowing accurate scheduling to avoid failure
- **Mitigate risk**
  Planning maintenance to avoid unplanned downtime makes budget forecasting easier, allowing more focus on corporate objectives



Performance Plus®

Performance Plus works to develop a strong reliability partnership to mitigate against unplanned downtime of mission critical equipment. We bring our global experience to a local level, with our experts integrating seamlessly into your facility to implement a tailored, data driven Managed Reliability Program

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

This structure means that John Crane is driven to implement field services and improvements that:

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

Our expert team allows you to focus on operational and corporate excellence whilst ensuring equipment downtime is kept to a minimum.



Training

The safety, performance, and reliability of energy services and industrial process plants directly depend on proper training. Led by seasoned engineers with real-world experience, John Crane provides a wide range of combined hands-on and classroom training courses for gas seals and mechanical seals. Instructing on the correct procedures for installing, operating and maintaining equipment components, these comprehensive training courses give end-user personnel, such as engineers, technicians, operators and mechanics, the knowledge necessary to optimize uptime by keeping their equipment running safely, smoothly and reliably.



johncrane.com/services/training

YOUR NAME IS HOW WE MAKE OURS



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

Europe
United Kingdom
Tel: 44-1753-224000

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

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

Asia Pacific
Singapore
Tel: 65-6518-1800

smiths
bringing technology to life

If the products featured will be used in a potentially dangerous and/or hazardous process, your John Crane representative should be consulted prior to their selection and use. In the interest of continuous development, John Crane companies reserve the right to alter designs and specifications without prior notice. It is dangerous to smoke while handling products made of PTFE. Old and new PTFE products must not be incinerated. ISO 9001 and ISO 14001 Certified, details available on request.

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