

Corrugating Industry

Advanced steam joint technology

KADANT
AN ACCENT ON INNOVATION

Steam joint solutions
for demanding
applications.

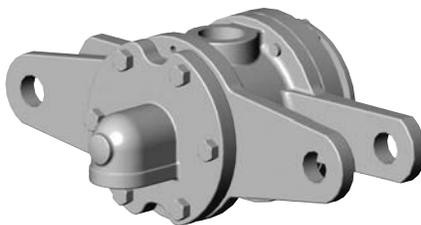


Engineered reliability and performance.

Innovation



Self-Supported



Rod-Supported



Bracket-Supported



SXB

LJ-PT

CorrPro

Rotary steam joints have been a part of the corrugating manufacturing process since the 1930s, when Kadant Johnson introduced the rotary pressure joint. Since then, Kadant Johnson has incorporated advances in sealing technology, joint design, and materials to extend the application range of the conventional pressure-type joint.

At the same time, Kadant Johnson has led the evolution from self-supported to rod-supported pressure-type joints to today's CorrPro™ joint with its balanced seal, 360° bracket-support, and advanced syphon design.

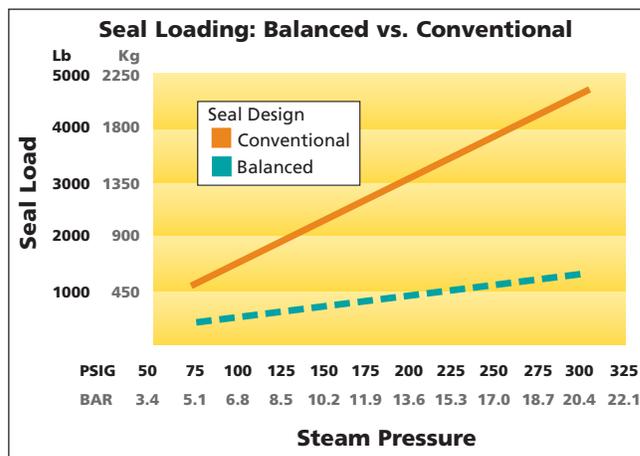
Kadant Johnson's advanced seal technology and extensive line of rotary joints provide increased reliability and performance for any corrugator application, even at operating speeds in excess of 1,500 fpm (460 mpm) and steam pressures up to 300 psig (20 bar).

Seal technology for demanding applications

Until recently, the most popular sealing technology used in corrugating applications was the pressure-type joint, with resin-impregnated carbon graphite seal rings. Antimony impregnated seal rings have since replaced the resin seals to allow higher speeds and steam pressures and longer seal ring life.

Today, balanced seal technology combined with advanced seal geometry offers maximum seal life, reduced maintenance downtime, and improved reliability at any speed.

With its spring-loaded piston and convex antimony seal, the Kadant Johnson PT (piston type) seal technology is far different than conventional seal packages. Available exclusively in the PT steam joint line, the advanced design makes the PT seal a more reliable, easier-to-maintain, and longer lasting component. At high operating pressures, the PT seal load is a fraction of a conventional joint's seal load. This reduces seal wear and extends seal life. The PT seal design handles run-out and angular misalignment while offering a large flow area through the rotary joint.

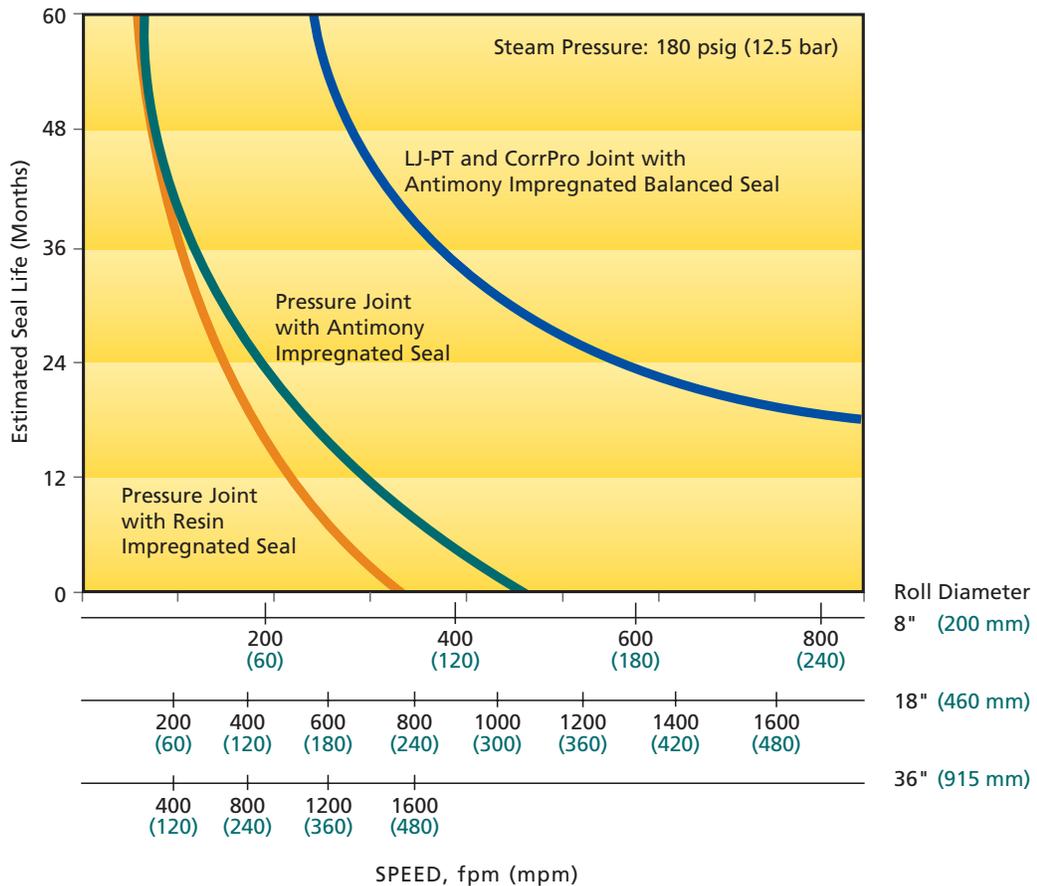


Improving steam joint reliability

Antimony seal rings

Antimony impregnated seal rings have been proven to be superior to standard carbon graphite seal rings and are used by many corrugators today. Antimony seal rings tolerate the high temperature created by steam pressure and seal friction. Antimony impregnated seal rings can increase the operating life of pressure joints operating at high speeds. When used in balanced seal PT-style rotary joints, the seal life is unsurpassed.

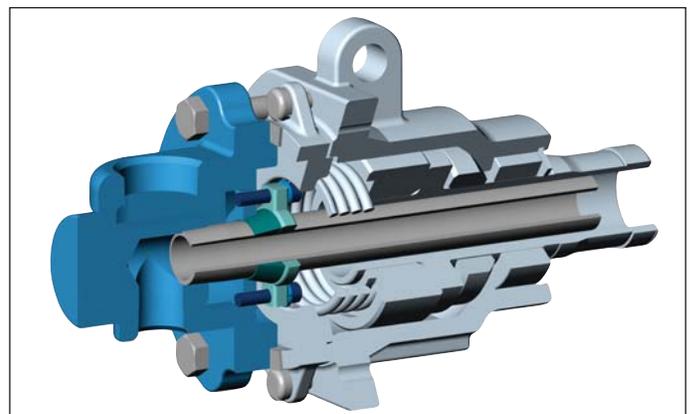
Typical life expectancy of Kadant Johnson seal rings



Split wedge syphon support

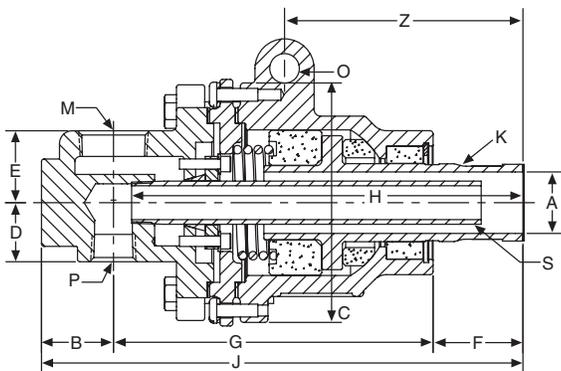
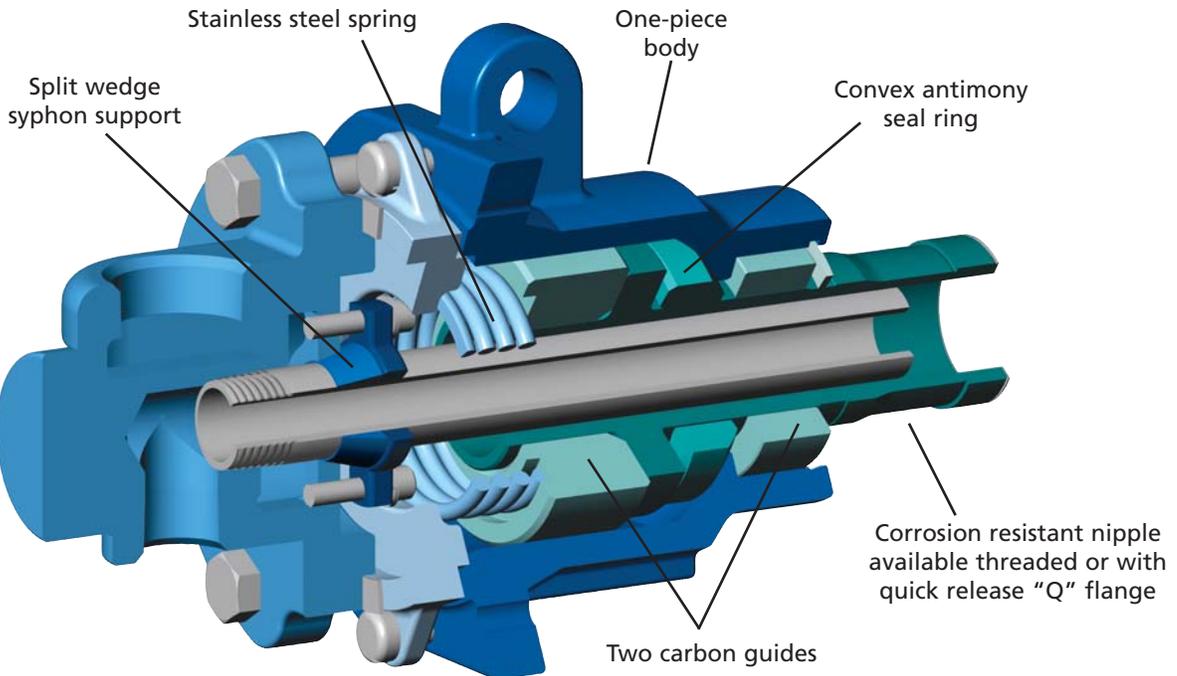
To improve the syphon performance and reduce maintenance, the split wedge syphon support is recommended for use in all joints on preheaters, fluting rolls, pressure rolls, and glue rolls.

The split wedge and pressure plate device relieves the stress found in the threads of the cantilevered horizontal syphon pipe. When the split wedge syphon support is used, the potential for syphon pipe breakage is greatly reduced.



SX rotary joint shown with the split wedge syphon support.

SXB Joint



Ratings

Maximum Pressure:	300 psig (20 bar)
Maximum Temperature:	550°F (288°C)
Maximum Speed:	350 RPM

Recommended Options

- ▶ Split wedge syphon support
- ▶ Antimony impregnated seal ring
- ▶ Adjustable syphon device

Size (K)	M	P	S	A	B	C	D	E	F	G	H	J	O	Z	Units
1¼"	1"	½"	¾", 1½"	1.25	2.00	5.25	1.38	1.81	2.00	7.12	8.37	11.06	0.56	4.81	inches
				32	50	133	35	46	50	180	213	280	14	122	mm
1½"	1¼"	¾"	1½", ¾"	1.50	1.75	6.56	1.44	1.75	2.19	7.81	9.50	11.75	0.72	5.81	inches
				38	45	167	36	45	55	198	240	298	18	148	mm
2"	1½"	¾"	1½", ¾"	1.94	2.25	6.94	1.50	1.88	2.25	8.44	10.12	12.94	0.88	6.12	inches
				49	57	176	38	48	57	214	257	330	22	155	mm

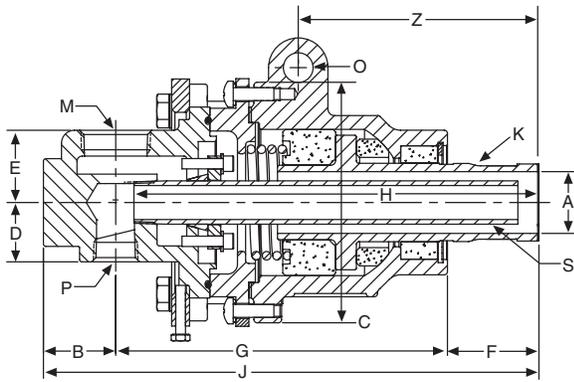
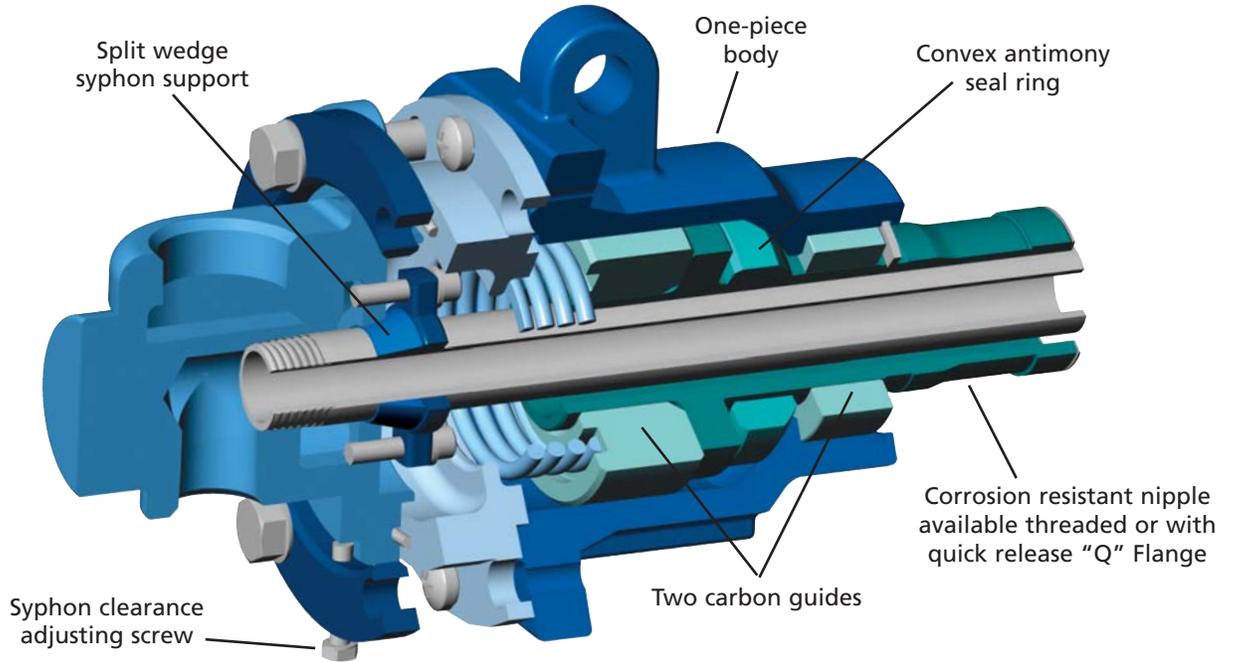
Features

- ▶ Two internal support guides
- ▶ Optimized seal diameter
- ▶ Convex seal ring in compression
- ▶ Maximum carbon guide separation
- ▶ Adjustable syphon clearance option
- ▶ Seal wear indicator

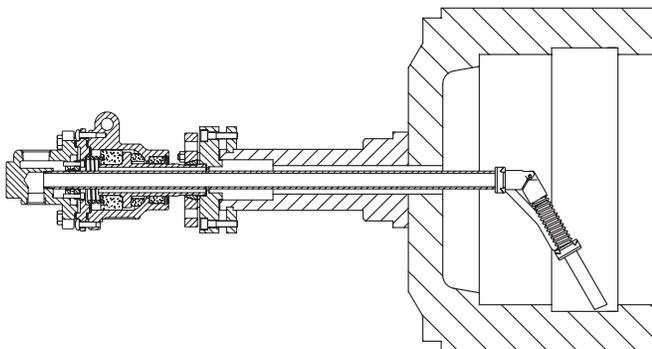
Benefits

- ▶ Increased life and reliability
- ▶ Extended seal life, reduced maintenance
- ▶ Self-aligning seal, longer life
- ▶ Improved joint and syphon support
- ▶ Repeatable syphon clearance adjustment
- ▶ On-machine measurement of seal wear

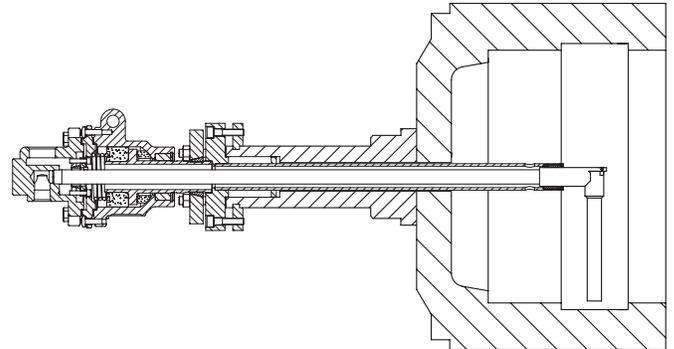
Adjustable syphon device



Size (K)	M	P	S	A	B	C	D	E	F	G	H	J	O	Z	Units
1½"	1¼"	¾"	½", ¾"	1.50	1.75	6.56	1.44	1.75	2.19	8.00	9.69	11.94	0.72	5.81	inches
				38	45	167	36	45	55	203	246	303	18	148	mm

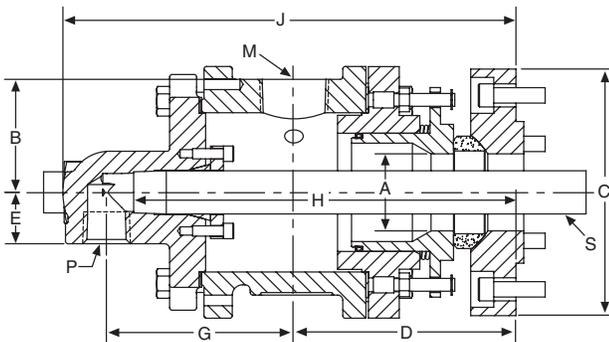
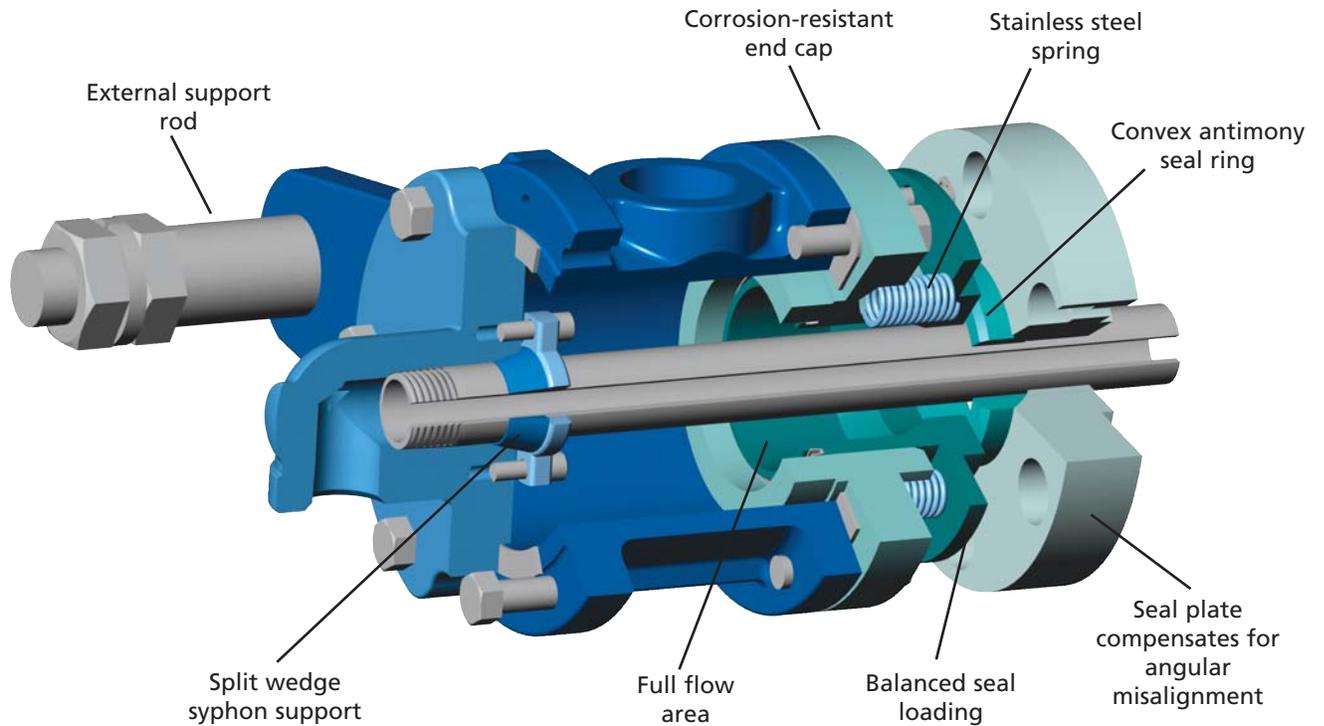


SXB joint with spring-lock elbow



SXB joint with 90° locking elbow and support tube

LJ-PT Joint



Ratings

Maximum Pressure:	225 psig (15 bar)
Maximum Temperature:	450°F (232°C)
Maximum Speed:	400 RPM

Size	M	P	S	A	B	C	D	E	G	H	J	Units
1½"	1¼"	¾"	¾"	1.88	2.75	6.12	5.38	1.25	4.56	9.56	11.06	inches
				48	70	155	137	32	116	243	280	mm

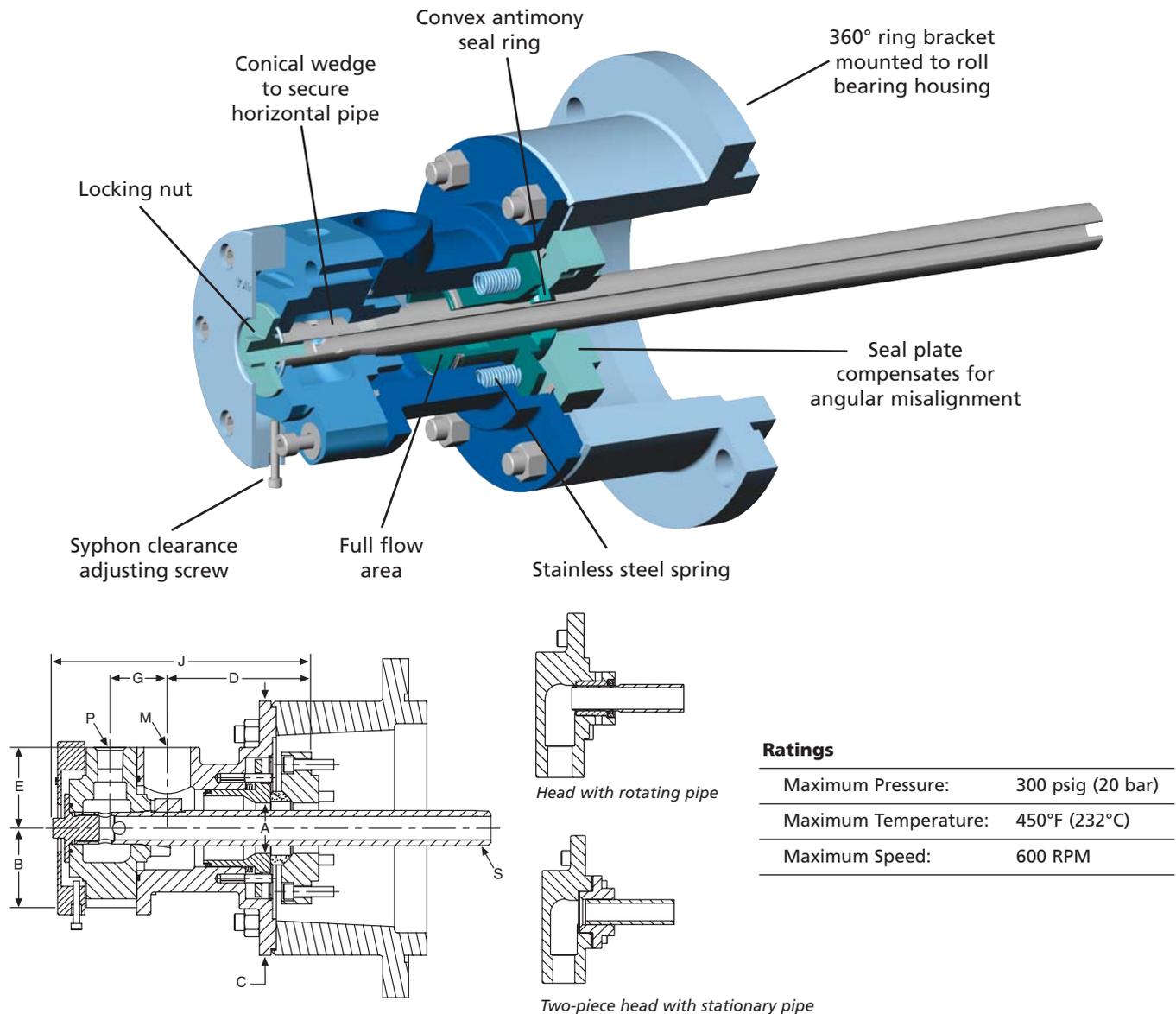
Features

- ▶ Balanced seal design with AI technology
- ▶ External rod-supported, locked in place
- ▶ Seal wear indicator
- ▶ Retrofit type LJ joints
- ▶ Adjustable syphon clearance option

Benefits

- ▶ Minimized seal loading and seal wear
- ▶ Increased reliability at higher speeds
- ▶ On-machine measurement of seal wear
- ▶ No piping modifications, easy upgrade
- ▶ Repeatable syphon clearance adjustment

CorrPro™ Joint



Ratings

Maximum Pressure:	300 psig (20 bar)
Maximum Temperature:	450°F (232°C)
Maximum Speed:	600 RPM

Size	Syphon Type	M	P	S	A	B	C	D	E	G	J	Units
1½"	Stationary	1¼"	¾"	¾"	1.88	3.00	9.50	5.38	3.00	2.12	9.62	inches
					48	76	2.41	137	76	54	244	mm
1½"	Rotating	1¼"	¾"	¾", 1"	1.88	3.00	9.50	5.43	3.00	2.19	8.38	inches
					48	76	2.41	138	76	56	213	mm

Features

- ▶ Balanced seal design with AI technology
- ▶ Circular bracket mounting
- ▶ Seal wear indicator
- ▶ Adjustable syphon clearance
- ▶ Accommodates thermal expansion up to 12 mm

Benefits

- ▶ Minimized seal loading and seal wear
- ▶ Rigid support for safety and reliability
- ▶ On-machine measurement of seal wear
- ▶ Optimize heat transfer and temperature uniformity
- ▶ Designed for "wide roll" installations

Optimizing Heat Transfer

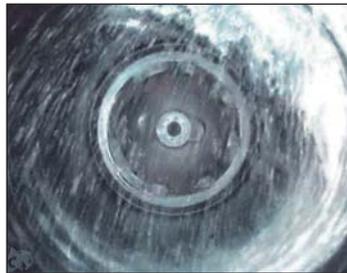
Condensate can be a significant resistance to heat transfer through the roll. It is important to optimize the level of condensate to achieve a high heat transfer rate and a uniform temperature profile. High, uniform, and consistent heat transfer will provide increased production, quality, and operating efficiency.

Kadant Johnson was the first to introduce a system for external adjustment of the syphon clearance. This unique design allows the operator to adjust the clearance between the internal roll surface and the syphon pipe after the joint and syphon equipment is installed. Rather than "tilt" the syphon pipe, the Kadant Johnson design moves the entire syphon assembly up and down with an external adjusting screw. Once the adjustment is made, the syphon mounting is locked in place when the head bolts are tightened.

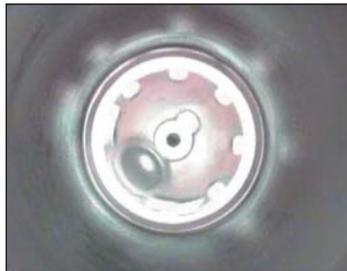
At the Kadant Johnson Research Center, one area of development focuses on condensate behavior and optimization of heat transfer inside rotating cylinders. For more than 70 years, Kadant Johnson had lead the industry in new discoveries and innovation in steam joint design, syphon systems, and heat transfer studies. Today, Kadant Johnson offers the only dedicated R&D center for studying condensate behavior and its impact on corrugator efficiency and runnability complemented by in-depth knowledge of steam system design and application.



Puddling condensate provides little resistance to heat transfer.



Cascading condensate creates turbulence and high heat transfer.



Thick rimming condensate creates a high resistance to heat transfer.

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CI-3003 02/2008
replaces CI-3002
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