



Solutions for rotary applications

High performance
PTFE rotary lip seals
Custom engineered

Solutions for rotary applications

Bal Seal Engineering is an industry leader providing custom-engineered sealing, connecting and loading solutions to OEM product designers. Our engineering department works closely with our customers to provide valuable, innovative product designs. Whether you're looking for spring-energized PTFE seals, rotary lip seals, EMI gaskets, electrical spring contacts or mechanical couplings, our spring and sealing solutions offer enhanced functionality, simplified designs and improved longevity decreasing downtime.

Bal Seal Sealing Solutions meet your unique reciprocating, rotating and static application needs. We can also offer your OEM designers customized parts to meet the demanding needs for applications requiring superior sealing performance in high vacuum pressures from 1×10^{-8} torr or extreme high pressures up to 7,000 kg/Bar², or cryogenic temperatures from -269° C to 320° C with varying speed and pressure combinations (PV). Our dedicated engineering and prototype departments work in tandem to provide complete solutions for your needs. In some cases, designs and prototype parts can be provided within one week of initial contact. To provide complete solutions, we can even include cartridge or housing/piston assemblies when necessary. And our seals are typically made from proprietary materials formulated and processed internally for complete quality control.

Bal Seal also offers a full line of unique and patented canted coil spring products with various applications for electrical-mechanical couplings and connecting devices. Our springs are fabricated from wire sizes of .05 to 2.03mm and coil sizes of .38mm to 25.4mm. Production materials include stainless steel (302 and 316), high nickel alloys (such as MP35N®, Hastelloy®, and Inconel®), Beryllium Copper, Zirconium Copper, and Titanium. Our custom spring products can be designed to provide specific insertion and removal forces, the proper housing groove and spring combination, and various electrical properties to simplify designs and to solve conductivity issues.

Bal Seal is a complete solutions provider. We not only offer spring and sealing solutions, but also offer design assistance, plastic and metal fabrication and component sub-assembly work to provide you with a one-stop design engineering and production facility. So whether you're trying to protect sophisticated electronic computing and communications equipment from RF interference or if you have implantable medical device or high current-carrying switchgear connectivity issues, Bal Seal has the right solution for you. Call us today so we can accommodate your specific requirements.



K31 series



KSS series



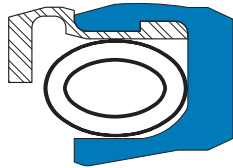
KP series

DESIGN FEATURES

Rotary Bal®Seal designs have notable performance boosting features:

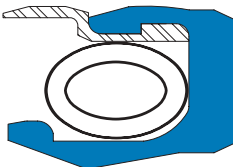
- Patented canted coil technology that provides positive, constant-force seal energizing.
- Unique locking ring designs that securely retain seals through temperature cycling and pressure environments—while providing ease of installation.
- Exclusive seal jacket configurations that are optimized to provide best sealing and life performance.

SEAL TYPES WITH METAL LOCKING RINGS



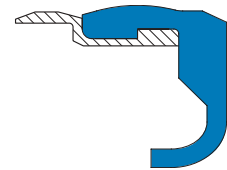
KSS/KS Series

- Locking ring retention.
- Canted Coil spring energizing.
- Reduced lip length for optimum sealing loads.
- Medium speeds and pressures.



K31/KF31 Series

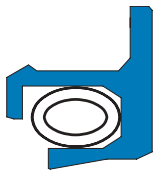
- Locking ring retention.
- Canted Coil spring energizing.
- Full lip for increased versatility of assembly.
- Medium speeds and pressures.



KP/KPF Series

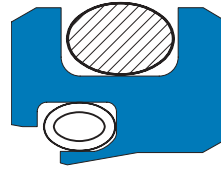
- Locking ring retention.
- Memory lip energizing.
- High speeds and very low pressures.

OTHER ROTARY SEAL TYPES



RS31 Series

- Flange mounted retention.
- Canted Coil spring energizing.
- Reduced lip length for optimum sealing loads.
- Medium speeds and pressures.



71 Series

- 'O' Ring retention.
- Canted Coil spring energizing.
- Reduced lip length for optimum sealing loads.
- Low speeds and pressures.



S31 Series












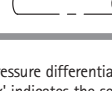
- Press-in mounting.
- Canted Coil spring energizing.
- Reduced lip length for optimum sealing loads.
- Very low speeds and pressures.



PB Series

- Press-in mounting.
- Memory lip energizing.
- Medium speeds and very low pressures.

Rotary Bal Seal Selection Guide

Seal Type	Series Code**	Standard Seal Cross Sections Available	Seal Inside Diameter Available	Suggested Operating Conditions				Features and Benefits	
				Pressure Range		Temperature Range	Surface Speed		
				Uncaptivated Seal Gland  (Bar)	Captivated Seal Gland  (Bar)				(°C)
	KSSx (50-621)	2,50 only	From 3,00 to 20,0	Pressure* Differential to 1 ↓	Vacuum to 211 ↓	Continuous -54° to +177° ----- Intermittent to +288° ↓	to 15 ↓	<ul style="list-style-type: none"> • Low insertion force. • Autoclavable. • Best Sealing at high temperature. • Longest seal life. • Metal locking ring. 	
	KSx (50-403)	From 4,00 to 12,50	From 25,0 to 860,0						
	K31x (50-389)	From 1,00 to 4,00	From 1,50 to 25,0						
	KF31x (50-389)	From 4,00 to 12,50	From 25,0 to 860,0						
	KPx (50-416)	From 1,00 to 5,00	From 1,50 to 25,0	to 0.5 ↓	to 1 ↓	↓	to 38 ↓	<ul style="list-style-type: none"> • Low friction. • Long life. • Good sealing. • High Temperature. • Locking seal in housing. • Metal locking ring. 	
	KPFX (50-416)	From 2,50 to 12,50	From 25,0 to 360,0						
	RS31x (50-615)	From 1,00 to 12,50	From 1,50 to 1900,0	Not applicable	Vacuum to 211	↓	to 15	<ul style="list-style-type: none"> • Better sealing. • Lower cost. • Requires retaining 	
	S31X (50-611)	From 0,50 to 12,50	From 0,50 to 300,0	Not Recommended ↓	to 1.8		Continuous -29° to +93° ----- Intermittent to +121° ↓	to 1.3	<ul style="list-style-type: none"> • Moderate cost. • Good sealing.
	71x (50-551)	From 2,00 to 12,50	From 1,50 to 360,0		Vacuum to 4			to 4	
	PBx (50-599)	From 1,00 to 12,50	From 1,50 to 360,0			to 1		to 5	<ul style="list-style-type: none"> • Compatibility with most fluids. • Lowest cost. • Low friction.

(*) Pressure differential varies depending on seal diameter and cross section. The larger the diameter and cross section the lower the pressure differential. Consult technical sales for assistance.

(**) 'x' indicates the seal series cross section. Where : 1=0.5mm; 0=2.0mm; 4=2.5mm, 5=4.0mm, 6=5.0mm, 7=7.0mm, 8=10.0mm, 9=12.5mm.

(1) The selection guide listed above represents a small portion of the many rotary seal solutions that we offer. Consult our technical sales for prompt design proposals and assistance.

(2) Values of pressure, temperature and surface speed represent the maximum independent operating conditions, such maximum values should not be combined with each other.

(3) For sizes larger than 25mm, a backup ring may be required.

Typical Materials for Rotary Bal Seals

SEAL MATERIALS Code and Descriptions	Temperature Range (°C)	Wear Resistance	FDA Compatibility	Chemical Compatibility
GFPA GRAPHITE FIBER REINFORCED PTFE (NEW) Severe service conditions. Excellent performance in applications with medium pressure, low speed and high temperature. Color=Black.	-196 to +260	Very High	No	Very Good
SP45 POLYMER-FILLED PTFE General service applications. Good wear resistance in liquids. Low abrasion to dynamic mating surfaces. Suitable for high speed, low pressure. Color=Light Green.	-269 to +260	Very High	Yes	Good
SP50 POLYMER-PTFE BLEND General service applications. Excellent wear resistance in gases, air and vacuum. Limited wear resistance in water. Low abrasion to dynamic surfaces. Suitable for high speed low pressure. Color=Brown	-269 to +260	Very High	Yes	Good
UPC14 POLYETHYLENE BLEND Aqueous service. Excellent wear resistance in water. Excellent performance in applications at very low speed and pressure. Color=Translucent White.	-269 to +82	Highest (Water-only)	Yes	Good
T VIRGIN PTFE Very light duty service. Low friction. Excellent chemical compatibility. FDA approved. Low wear resistance. Low cost. Color=White.	-196 to +177	Lowest	Yes	Excellent
P41 HIGH PERFORMANCE POLYMER Suitable for sealing adhesives, viscous, abrasive materials where scraping action is required. Limited surface speed. Color=Beige.	-57 to +288	Highest	Yes	Good

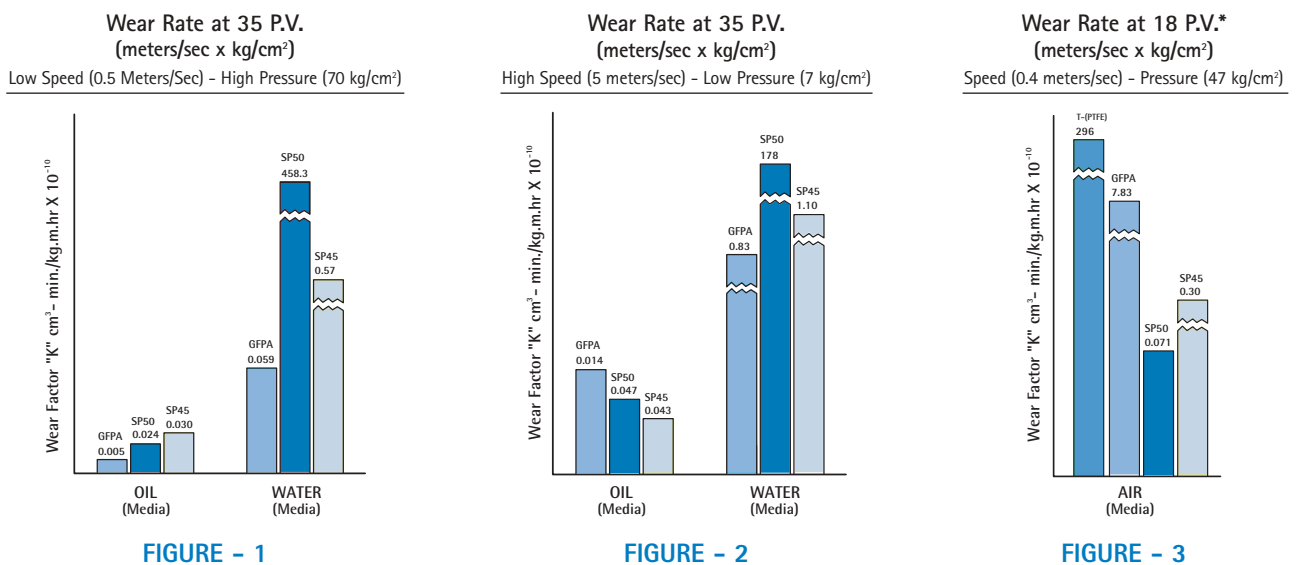
Other seal materials are available to meet special conditions and design requirements.

SPRING MATERIALS 302, 316, 316L Stainless Steel., Hastelloy, Inconel and others.	LOCKING RING MATERIALS 303, 304, 316, 316L Stainless Steel, Aluminum, Mild Steel and others.
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Material Wear Factor "K"

The wear factor 'K' of the material is an important consideration in material selection. Various wear factors are shown to aid in seal material selection. The wear is affected substantially by the media in which it is used.

WEAR FACTOR 'K' FOR VARIOUS PTFE BAL® SEAL MATERIALS IN OIL, WATER AND AIR



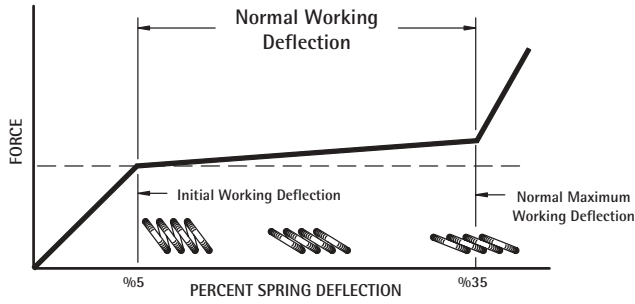
* Maximum recommended PV value is air is 18 meters/sec-kg/cm²
(50-439)

Bal Seal Canted-Coil Seal Energizers

"Canted Coil" BAL®Springs: Key to successful sealing reliability in a compact package

The large working deflection range and the constant force developed by the patented spring within the working deflection makes this the seal of choice for rotary service. Where sealing reliability is an important consideration, rotary service requires seals that can withstand high eccentricities, angular misalignment, low seal wear and maintain the constant sealing force necessary for long life and maximum sealing ability.

Figure 4 below shows a plot of force vs. deflection that reflects the unique property of the "Canted Coil" BAL®Spring: Constant force developed over the normal working deflection of the spring.



Canted Coil Bal Spring

FIGURE - 4

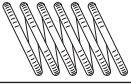
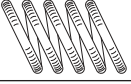
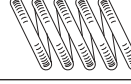
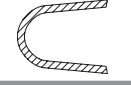


Other Types of Bal Seal Energizers

Bal Seal offers seals with cantilever type energizer elements. This type of spring energizer is recommended for some slow rotary application where scraping and wiping action is required. Typical applications are paint pumps, laboratory equipment and food processing equipment.

Springs with Different Sealing Forces

Rotary Bal®Seals are supplied with springs of various loading characteristics. Figure 5 describes various properties and typical usages.

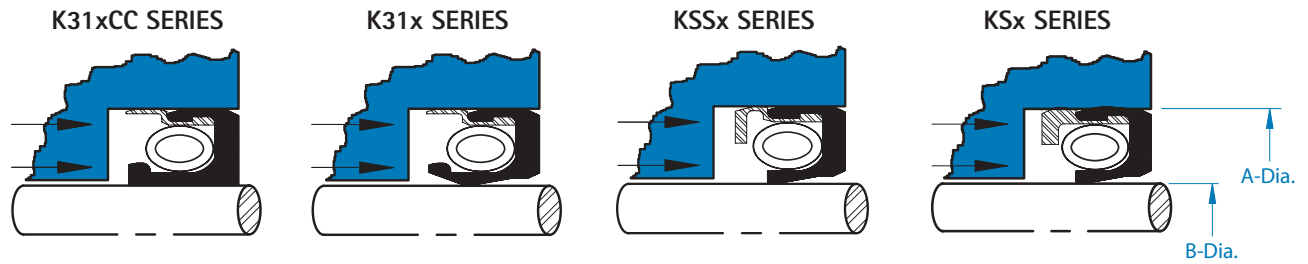
Spring Load P/N Code	Friction	Spring Loading	Expected Wear	High Speed	Vacuum/ Gas	High Pressure	Low Temperature	Large Tolerances
 Light LB	LOW	LOWEST	LOW	E	NR	NR	NR	F
 Medium Light MC	MODERATE	MODERATE	MODERATE	G	F	F	G	G
 Medium MB	HIGH	HIGHEST	HIGH	F	E	E	E	E
 Medium M	HIGH	HIGHEST	HIGH	NR	E	E	E	F

Rating Symbols: E=Excellent, G=Good, F=Fair, NR=Not Recommended.

FIGURE - 5

An increase in the spring force generally results in better sealing, but with higher friction and seal wear. When media pressure is applied, the pressure and the energizing load of the Bal Spring combine to add additional sealing force, which also increases the sealing ability.

Recommended Size Ranges for Selected Series



Common Sizes

SIZE No. Call out	B Shaft Diameter (millimeters)	A Bore Diameter (millimeters)
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K311CC Series

1,0-mm Nominal Cross Section

	+0,000 -0,010	+0,010 -0,000
(0,5-1)	0,50	2,50
(1-1)	1,00	3,00
(2-1)	2,00	4,00

K311 Series

1,0-mm Nominal Cross Section

	+0,000 0,010	+0,010 -0,000
(1,5-1)	1,50	3,50
(2-1)	2,00	4,00
(3-1)	3,00	5,00
(4-1)	4,00	6,00*
(5-1)	5,00	7,00*

K310 Series

2,0-mm Nominal Cross Section

	+0,000 -0,010	+0,010 -0,000
(3-2)	3,00	7,00
(4-2)	4,00	8,00
(5-2)	5,00	9,00*
	+0,000 -0,025	+0,025 -0,000
(6-2)	6,00	10,00
(7-2)	7,00	11,00
(8-2)	8,00	12,00
(9-2)	9,00	13,00
(10-2)	10,00	14,00

KSS4 and K314 Series

2,5-mm Nominal Cross Section

	+0,000 -0,025	+0,025 -0,000
(3-2,5)	3,00*	8,00
(4-2,5)	4,00*	9,00
(5-2,5)	5,00*	10,00
(6-2,5)	6,00	11,00
(7-2,5)	7,00	12,00

SIZE No. Call out	B Shaft Diameter (millimeters)	A Bore Diameter (millimeters)
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KSS4 and K314 Series

2,5-mm Nominal Cross Section

	+0,000 -0,025	+0,025 -0,000
(8-2,5)	8,00	13,00
(9-2,5)	9,00	14,00
(10-2,5)	10,00	15,00
(12-2,5)	12,00	17,00
(14-2,5)	14,00	19,00
(16-2,5)	16,00	21,00
(18-2,5)	18,00	23,00
(20-2,5)	20,00	25,00

K315 Series

4,0-mm Nominal Cross Section

	+0,000 -0,025	+0,025 -0,000
(5-4)	5,00*	13,00
(6-4)	6,00	14,00
(7-4)	7,00	15,00
(8-4)	8,00	16,00
(9-4)	9,00	17,00
(10-4)	10,00	18,00
(12-4)	12,00	20,00
(14-4)	14,00	22,00
(16-4)	16,00	24,00
(18-4)	18,00	26,00*
(20-4)	20,00	28,00*
(22-4)	22,00	30,00*
(24-4)	24,00	32,00*
(25-4)	25,00	33,00*

KS6 and K316 Series

5,0-mm Nominal Cross Section

	+0,00 -0,04	+0,04 -0,00
(25-5)	25,00*	35,00
(26-5)	26,00	36,00
(28-5)	28,00	38,00
(30-5)	30,00	40,00
(32-5)	32,00	42,00

SIZE No. Call out	B Shaft Diameter (millimeters)	A Bore Diameter (millimeters)
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KS6 and K316 Series

5,0-mm Nominal Cross Section

	+0,00 -0,04	+0,04 -0,00
(34-5)	34,00	44,00
(36-5)	36,00	46,00
(38-5)	38,00	48,00
(40-5)	40,00	50,00
(45-5)	45,00	55,00*
(50-5)	50,00	60,00*
(55-5)	55,00*	65,00*
(60-5)	60,00*	70,00*

KS7 and K317 Series

7,0-mm Nominal Cross Section

	+0,00 -0,05	+0,05 -0,00
(45-7)	45,00*	59,00
(50-7)	50,00*	64,00
(55-7)	55,00	69,00
(60-7)	60,00	74,00
(65-7)	65,00	79,00
(70-7)	70,00	84,00
(75-7)	75,00	89,00
(80-7)	80,00	94,00
(90-4)	90,00	104,00*
(100-7)	100,00	114,00*
(150-7)	150,00*	164,00*
(200-7)	200,00*	214,00*

KS8 and K318 Series

10,0-mm Nominal Cross Section

(75-10)	75,00*	95,00*
to	to	to
(600-10)	600,00*	620,00*

KS9 and K319 Series

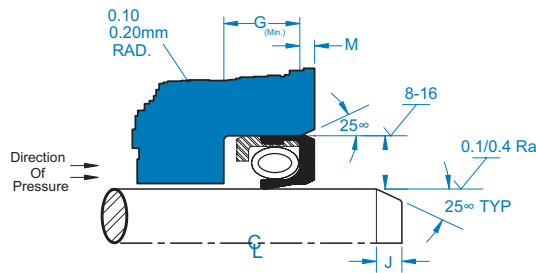
12,5-mm Nominal Cross Section

(90-12,5)	90,00*	115,00*
to	to	to
(860-12,5)	860,00*	885,00*

(*) = See page-7 for tolerances.

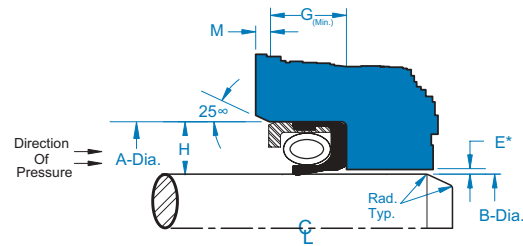
Consult technical sales for fast and complete recommendations with proposals.

Recommended Installation Dimensions



Uncaptivated Seal Gland
(UNCAPTIVATED: Seal can be forced out under direction of pressure)

FIGURE - 6



Captivated Seal Gland
(CAPTIVATED: Seal can not be forced out under direction of pressure)

FIGURE - 7

Seal Series	Nominal Cross-Section W (millimeters)	Gland Height H (millimeters)	Gland Width G (Min.) (millimeters)	Shaft Chamfer J (millimeters)	Housing Chamfer M (millimeters)
1	1,0	0,97 / 1,03	1,50	1,0 ±0,10	0,25 ±0,08
0	2,0	1,97 / 2,03	3,00	2,0 ±0,13	0,40 ±0,10
4	2,5	2,47 / 2,53	4,00	2,5 ±0,15	0,50 ±0,10
5	4,0	3,97 / 4,03	5,00	4,0 ±0,20	0,80 ±0,13
6	5,0	4,97 / 5,03	7,00	5,0 ±0,25	1,00 ±0,13
7	7,0	6,97 / 7,03	9,50	7,0 ±0,30	1,30 ±0,13
8	10,0	9,97 / 10,03	13,50	10,0 ±0,40	1,50 ±0,15
9	12,5	11,47 / 12,53	18,50	12,5 ±0,50	1,80 ±0,18

(50-688)

SUGGESTED SHAFT AND HOUSING TOLERANCES

Diameter Range (millimeters)	Shaft Tolerances (millimeters)	Housing Tolerances (millimeters)	Diameter Range (millimeters)	Shaft Tolerances (millimeters)	Housing Tolerances (millimeters)
0,50 to 5,00	+0,000 / -0,010	+0,010 / -0,000	50,01 to 100,00	+0,000 / -0,050	+0,050 / -0,000
5,01 to 25,00	+0,000 / -0,025	+0,025 / -0,000	100,01 to 150,00	+0,000 / -0,080	+0,080 / -0,000
25,01 to 50,00	+0,000 / -0,040	+0,040 / -0,000	150,01 to 400,00	+0,000 / -0,100	+0,100 / -0,000

(50-606-1)

RADIAL CLEARANCE "E" (millimeters) @ 21° C

Code	Cross Section	Pressure (kg/cm ²)			
		10	20	35	70
1	1,0	0,10	0,08	0,06	0,05
0	2,0	0,13	0,10	0,06	0,08
4	2,5	0,15	0,13	0,10	0,08
5	4,0	0,18	0,15	0,13	0,10
6	5,0	0,18	0,15	0,13	0,10
7	7,0	0,20	0,18	0,15	0,13
8	10,0	0,25	0,20	0,18	0,15
9	12,5	0,30	0,25	0,20	0,18

Request TR-94 for a report on factors affecting rotary Bal Seal performance

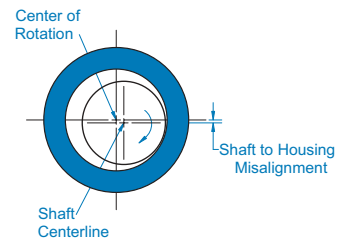
Dynamic Alignment

Seal Series	Seal Cross Section Height W	Typical Diameter Range (millimeters)	Allowable Runout (TIR)* at various Surface Speeds (meters/sec.) (with corresponding RPM at Average diameter range)				
			0,25	2,50	5,00	13,0	25,0
			meters/sec.	meters/sec.	meters/sec.	meters/sec.	meters/sec.
1	1,0 mm	1,50–5,00 (3,25 Avg.)	0,040 (1528-RPM)	0,025 (15,279-RPM)	0,013 (30,558-RPM)	NR (76,394-RPM)	NR (152,788-RPM)
0	2,0 mm	3,00–13,0 (8,00 Avg.)	0,060 (610-RPM)	0,040 (6,102-RPM)	0,025 (12,204-RPM)	0,013 (30,508-RPM)	NR (61,018-RPM)
4	2,5 mm	3,00–25,00 (14,00 Avg.)	0,090 (339-RPM)	0,060 (3,392-RPM)	0,050 (6,785-RPM)	0,025 (16,961-RPM)	NR (33,923-RPM)
5	4,0 mm	5,00–65,00 (35,00 Avg.)	0,110 (142-RPM)	0,09 (1,421-RPM)	0,080 (2,842-RPM)	0,040 (7,105-RPM)	NR (14,210-RPM)
6	5,0 mm	25,00–100,00 (63,00 Avg.)	0,130 (76-RPM)	0,100 (764-RPM)	0,090 (1,528-RPM)	0,050 (3,820-RPM)	NR (7,639-RPM)
7	7,0 mm	45,00–190,00 (118,00 Avg.)	0,150 (41-RPM)	0,130 (413-RPM)	0,110 (826-RPM)	0,080 (2,065-RPM)	0,050 (4,129-RPM)
8	10,0 mm	50,00–250,00 (150,00 Avg.)	0,180 (32-RPM)	0,150 (318-RPM)	0,140 (637-RPM)	0,100 (1,592-RPM)	0,080 (3,183-RPM)
9	12,5 mm	75,00–360,00 (218,00 Avg.)	0,190 (22-RPM)	0,180 (225-RPM)	0,170 (449-RPM)	0,130 (1,123-RPM)	0,100 (2,247-RPM)

(*)=Specified TIR is for spring loaded seals. For non spring loaded seal, the allowable runout is 20% lower.
NR = Not recommended consult Balseal.

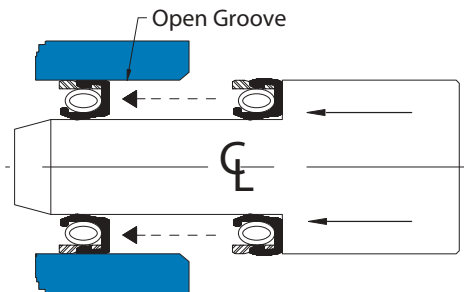
Shaft To Bore Misalignment at the seal area (STBM)

Shaft Diameter (millimeters)	STBM (millimeters)
0,00 to 20,00	0,050
20,01 to 40,00	0,080
40,01 to 80,00	0,080
80,01 to 150,00	0,100
150,01 to 250,00	0,130



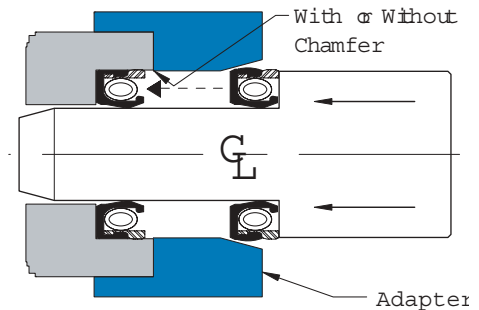
Shaft to Bore Misalignment
FIGURE - 8

Installation Configurations



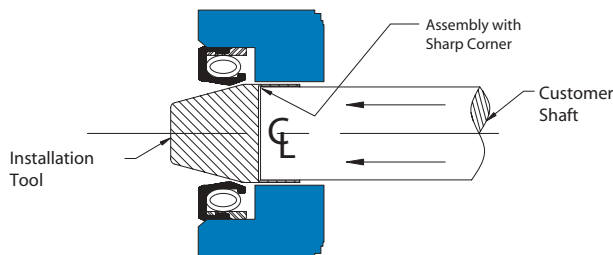
Assembly in an Open Gland

FIGURE - 9



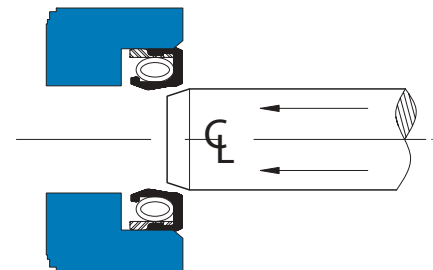
An Open Gland With Sharp Entry Corner

FIGURE - 10



Assembly of Shaft From Forward Direction

FIGURE - 11



Assembly of Shaft From Forward Direction

FIGURE - 12

Other specialized assembly methods are available. Consult Technical Sales. Refer to (50-561)

Request TR-94 for complete technical data on Bal seal rotary seals; Request TR-97 on "Tools for removing 'K' series Rotary Bal seals"

ROTARY LIP SEALS – DRAWING REQUEST FORM

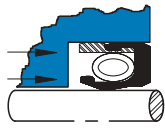


Bal Seal provides immediate technical support. We encourage you to complete and send in this application information to our Technical Sales Department. You will receive a prompt seal design proposal and technical information.

Name: _____ Date: _____
 Title: _____
 Department: _____

Company: _____

Address: _____
 (street) (city, state) (zip code)

Telephone: _____ Ext. _____ Fax: _____ Email: _____

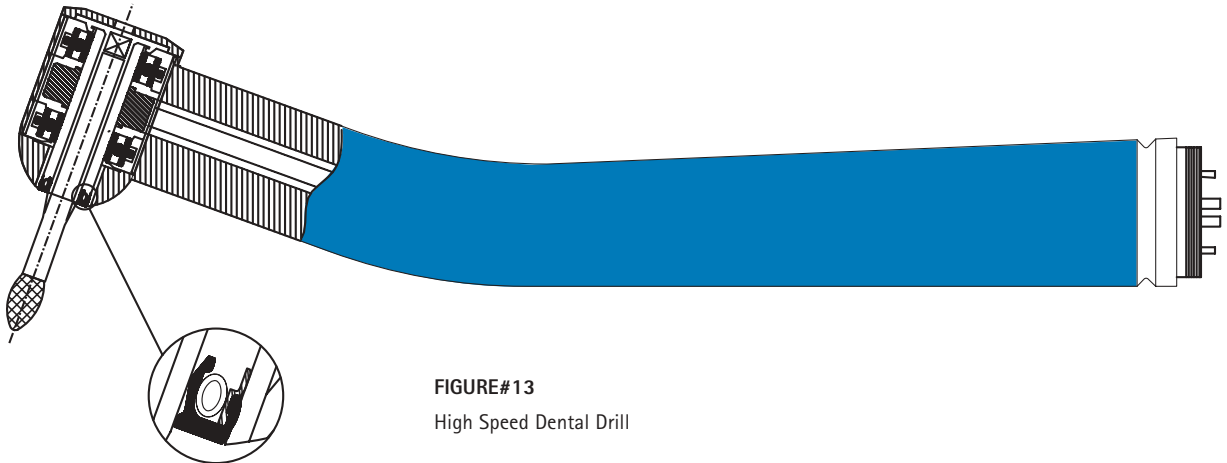
<p>SERVICE:</p> <input type="checkbox"/> Rotary - Continuous <input type="checkbox"/> Rotary - Intermittent <input type="checkbox"/> Oscillating <input type="checkbox"/> Other	<p>PRESSURE:</p> Max. _____ <input type="checkbox"/> kg/cm ² , bar, MPa Operating _____ <input type="checkbox"/> kg/cm ² , bar, MPa Vacuum: _____ <input type="checkbox"/> cm hg <input type="checkbox"/> Torr Splash/No Pressure <input type="checkbox"/> Cycling Pressure: _____	<p>CRITICAL FACTORS: Prioritize by number</p> ___ Friction ___ Compatibility ___ Life ___ Other ___ Cost Target _____ <input type="checkbox"/> Allowable Leakage _____cc/min.
<p>SPEED: Force/Torque/Life</p> <input type="checkbox"/> meters/sec. _____ <input type="checkbox"/> rpm _____ <input type="checkbox"/> cpm _____ <input type="checkbox"/> Hz _____ <input type="checkbox"/> Force/Torque _____ <input type="checkbox"/> gm <input type="checkbox"/> lb <input type="checkbox"/> Low _____ <input type="checkbox"/> gm-cm (low sealing ability) <input type="checkbox"/> High _____ <input type="checkbox"/> in-lb (high sealing ability)	<p>MEDIA TYPE:</p> Select one <input type="checkbox"/> Gas <input type="checkbox"/> Solids <input type="checkbox"/> Corrosive <input type="checkbox"/> Water <input type="checkbox"/> Abrasives <input type="checkbox"/> Other <input type="checkbox"/> Oil <input type="checkbox"/> Viscous <input type="checkbox"/> Cycling Temperature _____ <input type="checkbox"/> Other _____ Description of gas, liquid, solid media: <input type="checkbox"/> Specific Gravity _____ <input type="checkbox"/> Viscosity _____	<p>PRODUCT DATA:</p> Product Name: _____ _____ Annual Usage: _____ _____ Application is for: <input type="checkbox"/> Replacement <input type="checkbox"/> Prototype <input type="checkbox"/> Production <input type="checkbox"/> Other
<p>CONDITIONS:</p> <input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent <input type="checkbox"/> Infrequent <input type="checkbox"/> Others _____	<p>TEMPERATURE:</p> Intermittent: _____ Max. <input type="checkbox"/> °F <input type="checkbox"/> °C _____ Min. <input type="checkbox"/> °F <input type="checkbox"/> °C Continuous: _____ Max. <input type="checkbox"/> °F <input type="checkbox"/> °C _____ Min. <input type="checkbox"/> °F <input type="checkbox"/> °C Cycling _____ Other _____	<p>GLAND CONFIGURATIONS:</p> <input type="checkbox"/> Uncaptivated Seal Gland  <input type="checkbox"/> Captivated Seal Gland 
<p>SHAFT DATA:</p> Diameter: _____ in _____ mm Tolerance: _____ in _____ mm Material: _____ Hardness: _____ Rc Surface Finish: _____ <input type="checkbox"/> Ra; <input type="checkbox"/> RMS Plating/Coating: _____ Eccentricity _____ in _____ mm	<p>GLAND / BORE DATA:</p> Gland O.D. _____ in _____ mm Gland Width: _____ in _____ mm Tolerance: _____ in _____ mm Material: _____ Surface Finish: _____ Ra/RMS Plating/Coating Type: _____ Can the seal gland be modified? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes: Shaft <input type="checkbox"/> Yes <input type="checkbox"/> No Gland/bore <input type="checkbox"/> Yes <input type="checkbox"/> No Both <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Clamp On  <input type="checkbox"/> Other <input type="checkbox"/> Attach sketch

Other Options: Force Testing; Torque Testing; Leakage Testing
FLEXIBLE DELIVERY SCHEDULES AVAILABLE

Bal Seal products are usually made-to-order. Standard delivery for larger quantity orders is four to five weeks, though we can expedite small quantity and prototype orders. We can accommodate JIT, MRP planning, and special scheduling, and we encourage scheduling of blanket orders. Expedited deliveries are possible for a nominal extra charge. Products ship from our facility in California, U.S.A.

OPERATING PARAMETERS

- Pressure:** Atmospheric to autoclaved 2 Bar
- Speed:** 250 to 30.000 rpm
- Temperature:** 21°C to autoclaved 135°C
- Media:** Air, bearing grease, oral and sterilization fluids
- Additional:** Low friction, autoclavable

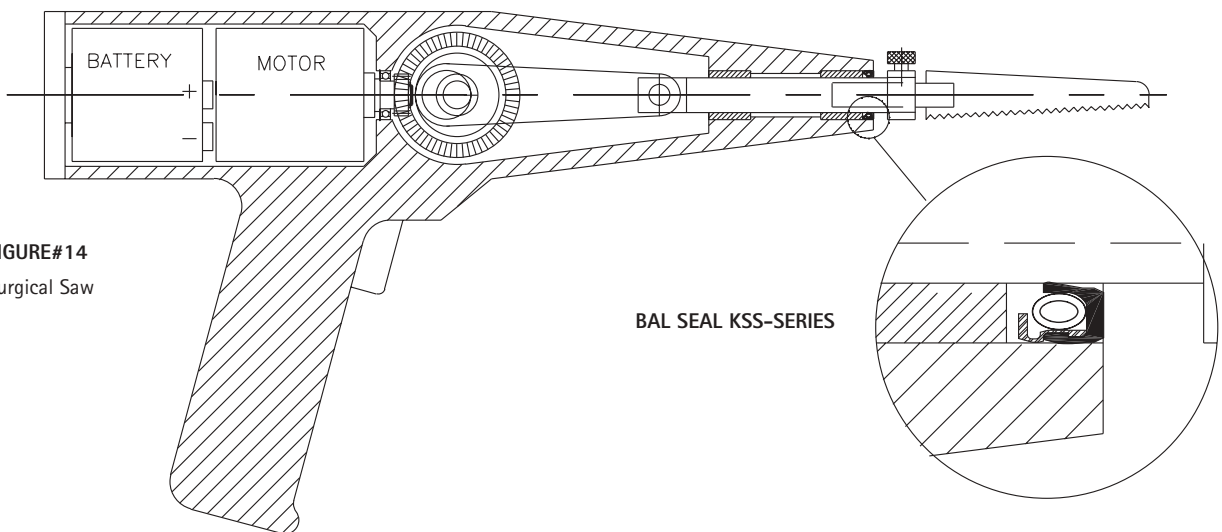


FIGURE#13
High Speed Dental Drill

WITH EXCLUDER
BAL SEAL K31-SERIES

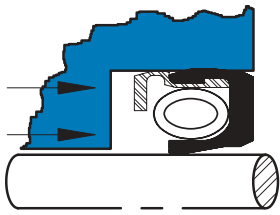
OPERATING PARAMETERS

- Pressure:** Atmospheric to autoclaved 2 Bar
- Speed:** 60 rpm
- Temperature:** 21°C to autoclaved 135°C
- Media:** Bone, tissue, bearing grease, and sterilization fluids
- Additional:** Low friction, autoclavable



FIGURE#14
Surgical Saw

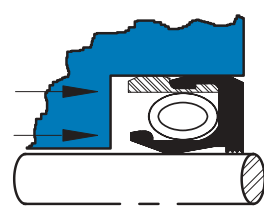
BAL SEAL KSS-SERIES



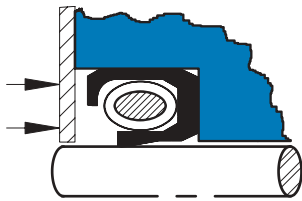
FIGURE#15
Low Pressure with Good Sealing Ability



FIGURE#16
Viscous Fluids at Low Speeds



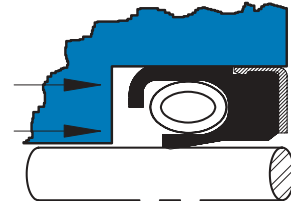
FIGURE#17
Medium Pressure, Dust Exclusion



FIGURE#18
Good Sealing Ability with low Dead Volume



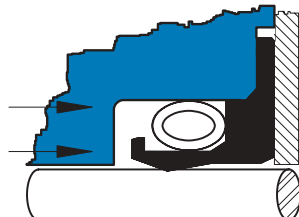
FIGURE#19
Bi-directional at Low Pressure



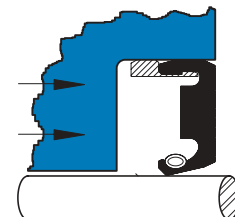
FIGURE#20
Higher Uncaptivated Pressures than KS-series.



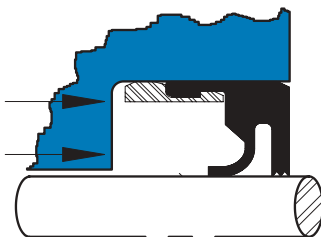
FIGURE#21
High Pressures



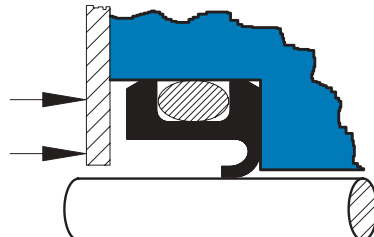
FIGURE#22
Cryogenic, Very Low Pressure



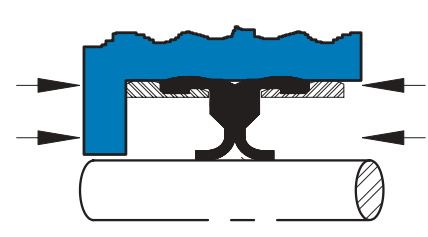
FIGURE#23
Large Cross-Section, Medium Pressure and Medium Speed



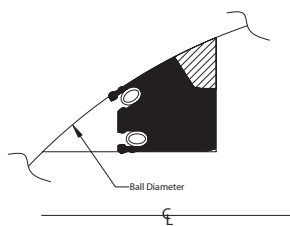
FIGURE#24
Low pressure, Dust Exclusion



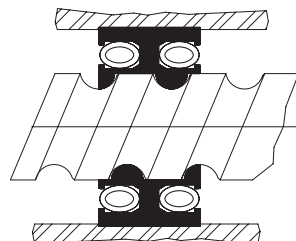
FIGURE#25
Low Speed, Low Pressure



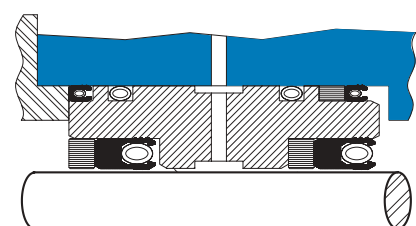
FIGURE#26
Bi-directional, Low Pressure



FIGURE#27
Ball Valve Seal



FIGURE#28
Ball Screw Seal



FIGURE#29
Bearing-Seal Package

IMPORTANT INFORMATION

CLEANING: Customer/End User is advised that Bal Seal products may require cleaning and/or sterilization prior to usage, depending on the application. (LE-110B)

WARNING: It is essential the end-user run evaluation testing under actual service conditions with a sufficient safety factor to determine if the proposed, supplied, or purchased, Bal Seal products are suitable for the intended purpose.

Welded springs have an increased probability of breaking or failing at or adjacent to the weld as opposed to other areas of the spring. This probability is increased further if the spring is used in an application involving extension of the spring. Temperature affects the properties (i.e., tensile, elongation, etc.) of the spring. Failure of Bal Seal Engineering Company, Inc. products can cause equipment failure, property damage, personal injury, and/or death. Equipment containing Bal Seal products must be designed to provide for the safe handling of any eventuality that may result from a partial or total failure of said Bal Seal products. Bal Seal products must be tested with a sufficient safety factor after installation. A program of regular maintenance and inspection must be performed. The User, through its own analysis and testing, is solely responsible for making the final selection of the products and for assuring that all performance, safety and warning requirements of the application are met (LE-110A)

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