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국내업계최초 Metal Bellows 국산화실현, 수출유망중소기업, INNO-BIZ인증
벤처기업선정, 우량기술기업선정, 우수품질인증(EM)획득, Q마크(품질보증)선정

MECHANICAL SEAL METAL BELLOWS



KSL

코리아 셀 라인 주식회사

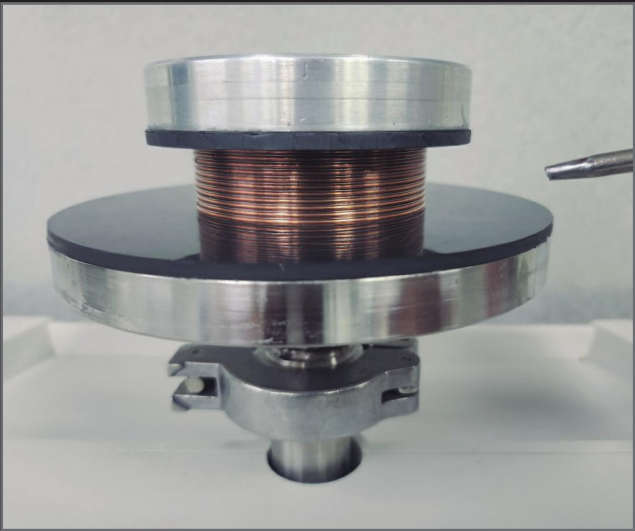
KOREA SEAL LINE CO., LTD.

A photograph of a worker in a white cleanroom suit and cap, viewed from behind, operating a piece of industrial machinery. A large CRT monitor is positioned in front of the worker, displaying a close-up of a mechanical part. The background shows another worker in a similar suit and a cleanroom environment with various pieces of equipment. The entire image has a greenish tint.

We are aim to high Quality and high Technology



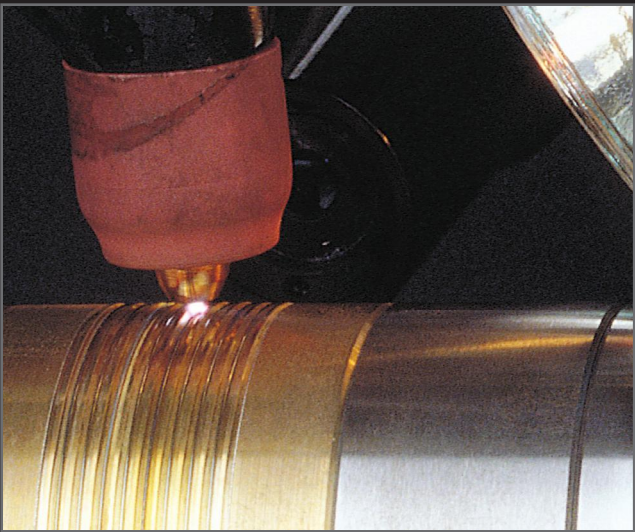
Ultra Precision Welding in Clean Room



Spectrometer Leak Detector



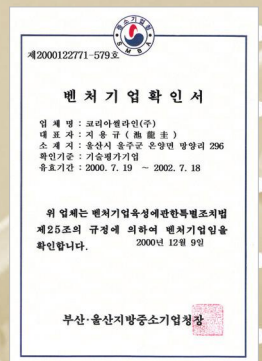
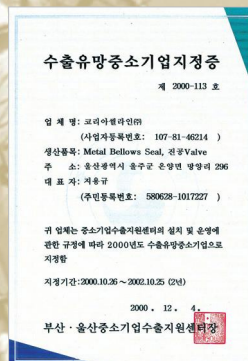
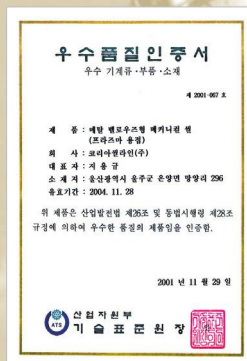
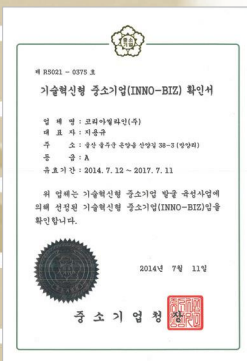
Bellows Tension Test



Bellows OD Plasma Welding

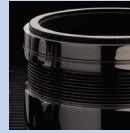


국내업체최초 Metal Bellows 국산화실현, 벤처기업선정, 수출유망중소기업, 우량기술기업, 우수품질(EM)선정 등



코리아 씰 라인(주)는 수년간 각고의 노력 끝에 Welded Metal Bellows를 국내 최초로 자체기술진에 의해 개발됨으로써 수입대체효과는 물론 막대한 로열티를 지불하지 않으므로 국내 중요 기간 사업은 물론, 중화학공업, 반도체장비, 진공 Valve, 우주항공산업에 지대한 영향을 줄 것으로 기대한다. 이에 대한 기술평가는 Mechanical seal 업체 최초 우수벤처기업 선정, 수출유망 중소기업선정, 우량기술기업선정, 우수품질(EM) 선정 등 더욱 정진하여 보다 나은 Service를 제공할 예정이다.

KSL Korea Seal Line Co., Ltd
President : Jee Yong Gyoo



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KOREA SEAL LINE CO., LTD.

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Pump

Seal

Agitator

Catalog



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I. Mechanical Seal의 선정 및 구조

1. Korea Seal Line의 적용 기준

Mechanical Seal 제조방법에 관하여 DIN 24960 및 ISO 3069의 Dimension에 입각하여 생산·설계하고 있으며, 이에 따른 보조장치는 API 610 규정에 따른다.

Korea Seal Line의 모든 제품은 직경 100mm까지는 DIN 규격에 의해 설계·제작되고 있으며, 직경 100mm이상일 경우 ISO 규격을 적용하고 있다.

다만 예외적으로 100mm이하일 경우라도 요청에 따라 ISO규격으로 제작 될 수 있어 어떠한 Pump의 Stuffing box에도 맞도록 설계되어 부품의 호환성을 높여 주고 있다.

2. Korea Seal Line의 재질 선정

Mechanical Seal Type의 선정기준 방법은 Type 3 Code와 Shaft dia 3 Code Material 5 Code 방식으로 표기한다.

Korea Seal Line Material : for example(Bellows type, Pusher type)

For Bellows Type Seal :

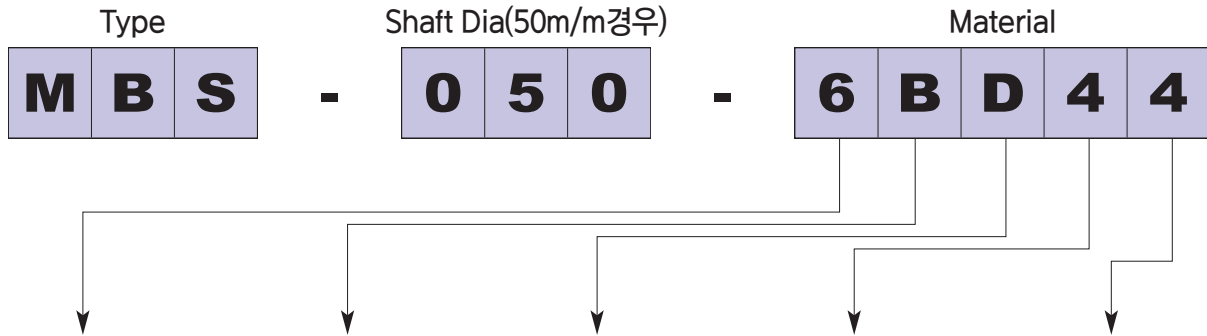
Series NO.	1st.	2nd	3th	4th	5th
Code No.	6	B	D	4	4
	↓	↓	↓	↓	↓
Material	Has-C+SUS316	Carbon,P.F	Silicon Carbide·S	Teflon Coated Viton	Teflon Coated Viton
Part Name	Bellows Assembly	Seal Ring	Insert	shaft packing	Insert Mounting

For Pusher Type Seal :

Series NO.	1st.	2nd	3th	4th	5th
Code No.	2	D	A	3	3
	↓	↓	↓	↓	↓
Material	SUS316	Silicon Carbide,S	Carbon,S	Viton	Viton
Part Name	Rotary Unit	Seal Ring	Insert	shaft packing	Insert Mounting

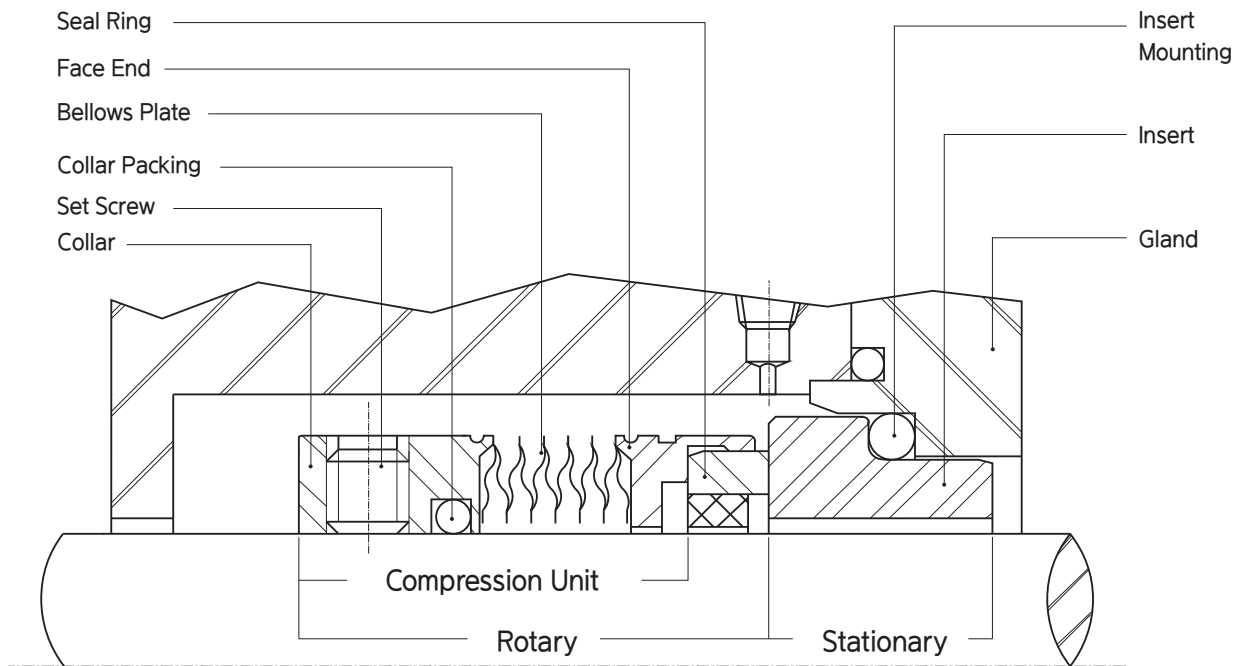
KOREA SEAL LINE Mateial Codes

“S” : Solid
 “A” : Sus Fit
 “B” : Has Fit

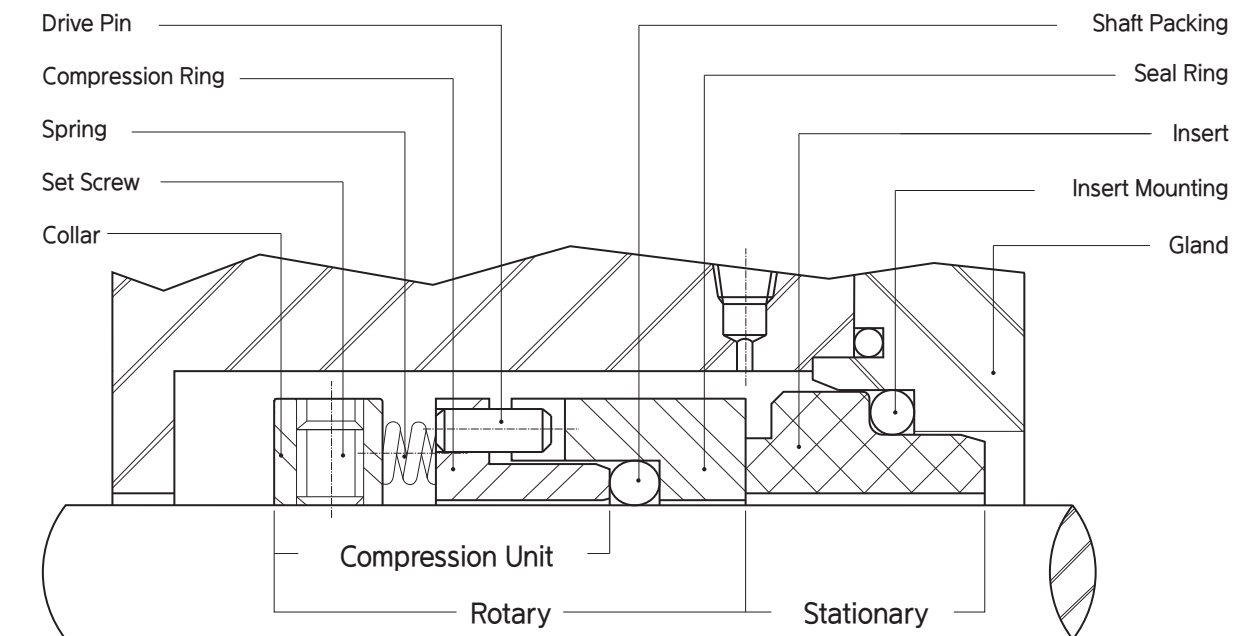


METAL PARTS 1st. digit		ROTARY FACE 2nd. digit		STATIONARY FACE 3th. digit		ROTARY PACKING 4th. digit		STATIONARY PACKING 5th. digit	
Symbol	Material	Symbol	Material	Symbol	Material	Symbol	Material	Symbol	Material
1	SUS 304	A	Carbon Solid	A	Carbon Solid	1	NBR	1	NBR
2	SUS 316	B	Carbon Press Fit	B	Carbon Press Fit	2	NEOPRENE	2	NEOPRENE
3	SUS 316L	C	SIC Press Fit	C	SIC Press Fit	3	VITON	3	VITON
4	ALLOY 20	D	SIC-“S”	D	SIC-“S”	4	TEFLON COATED VITON	4	TEFLON COATED VITON
5	Hastelloy B.C	E	Carbon Anti	E	Carbon Anti	5	KALREZ	5	KALREZ
6	Hastelloy+SUS 316	F	Ceramic Solid	F	Ceramic Solid	6	GRAFOIL	6	GRAFOIL
7	AM 350	G	Ceramic Facing	G	Ceramic Facing	7	TEFLON	7	TEFLON
8	Titanium	H	Tungsten press Fit	H	Tungsten press Fit	8	Silicon	8	Silicon
9	Inconel	I	Tungsten Solid	I	Tungsten Solid	9	EPDM	9	EPDM
10	Cu (LBC4)	J	Tungsten Facing	J	Tungsten Facing	10	Special	10	Special
11	Special	K	SSIC-“S”	K	SSIC-“S”				
		L	Rulon	L	Rulon				

3. Korea Seal Line의 구조의 명칭



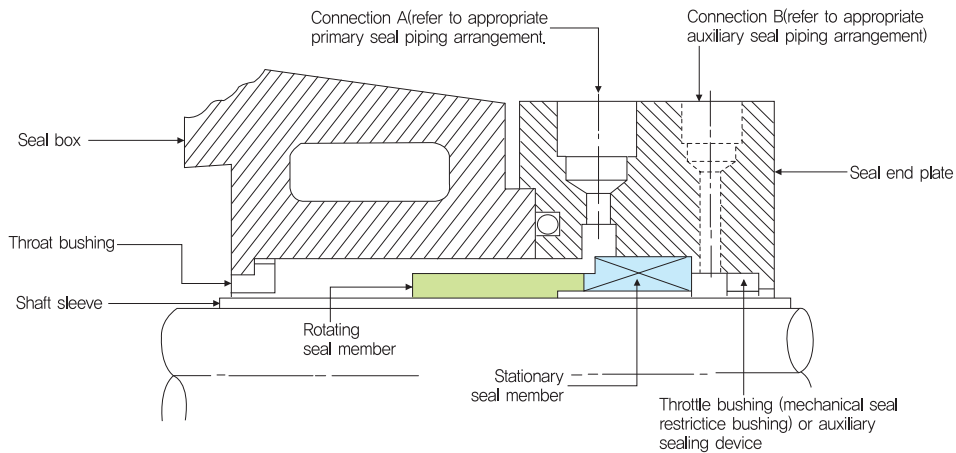
Bellows Seal Type (Non Pusher Type)



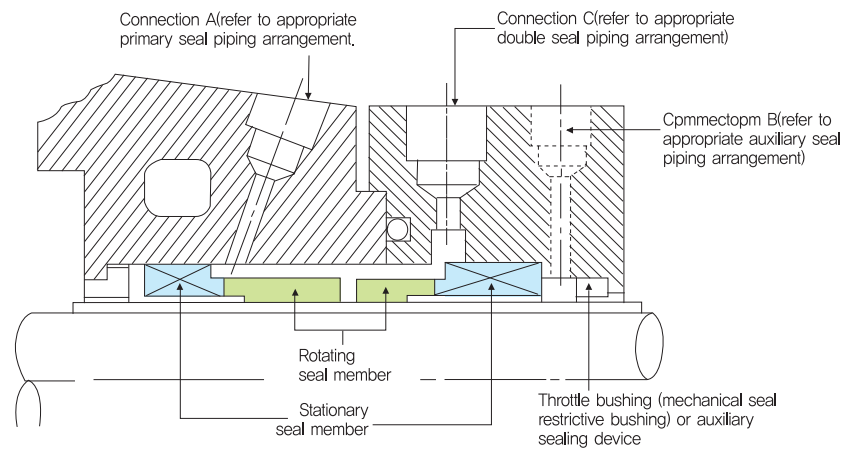
Spring Seal Type (Pusher Type)

4. Typical Mechanical Seal Arrangements

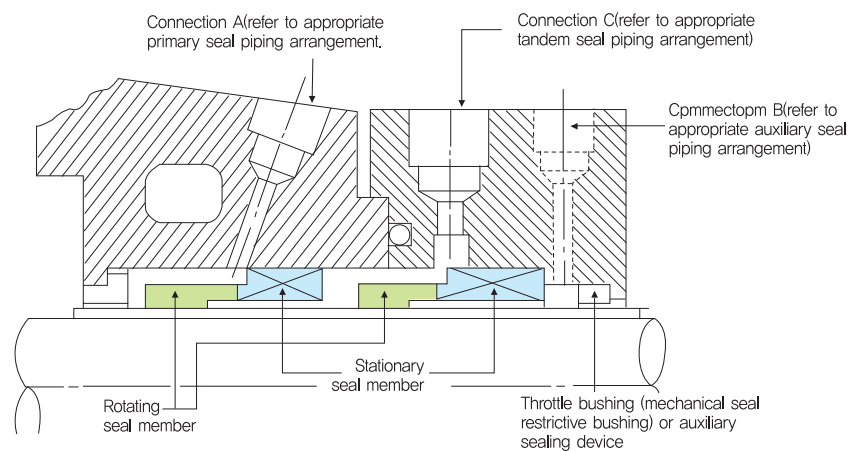
Single Seal



Double Seal

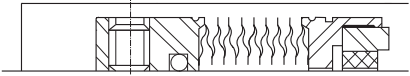
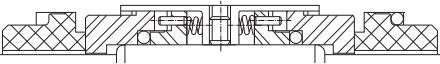
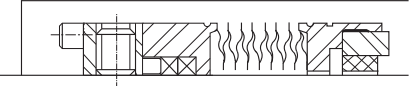
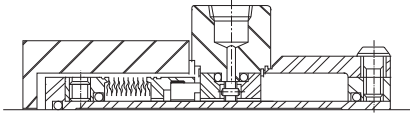
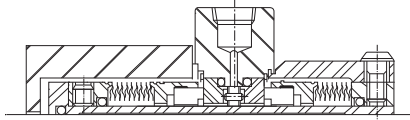
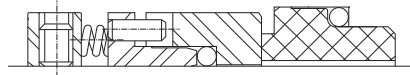
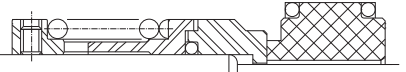
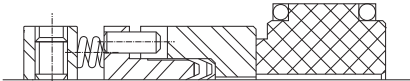
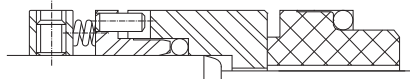
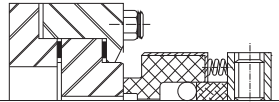
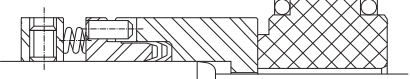
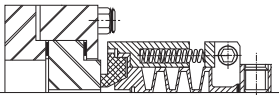
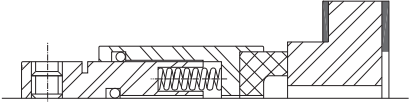
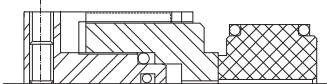
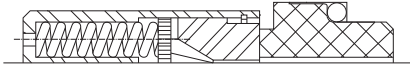
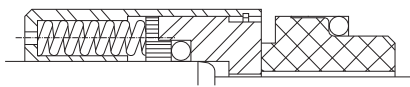
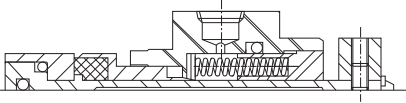
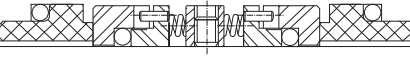
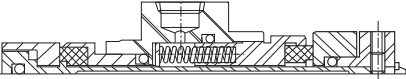


Tandem Seal

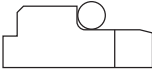
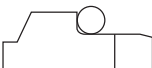
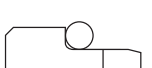
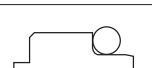
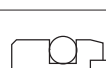
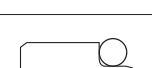
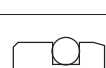
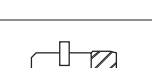
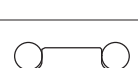
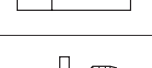
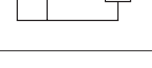


Note : These illustrations are typical and to not constitute any specific design

KOREA SEAL LINE ROTARY VERSION

TYPE	DRAWING	TYPE	DRAWING
MBS		SDB	
HBS		L1A	
SBS		L1B	
DBS		L1C	
K1A		L2B	
K1B		L3A	
K2A		L4B	
K2B		TBS	
K3B		L5B	
K4W		LWS	
K5A		KSM	
SDU		KSD	

KOREA SEAL LINE STAYIONARY VERSION

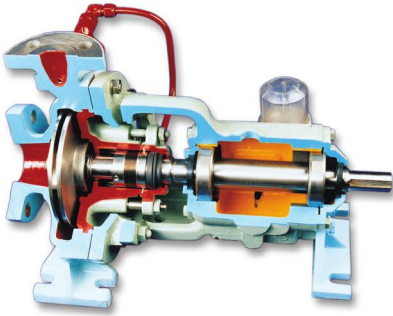
TYPE	VERSION	MATERIALS	TYPE	VERSION	MATERIALS
K1		1. CARBON/SOLID 2. T/C SOLID 3. SIC SOLID 4. CERAMIC SOLID	K16		1. CARBON/SOLID 2. T/C SOLID 3. SIC SOLID 4. CERAMIC SOLID
K2		1. CARBON/SOLID 2. T/C SOLID 3. SIC SOLID 4. CERAMIC SOLID	K17		1. T/C SOLID 2. SIC SOLID 3. CERAMIC SOLID
K3		1. CARBON/SOLID 2. T/C SOLID 3. SIC SOLID 4. CERAMIC SOLID	S1		1. T/C SOLID 2. SIC SOLID 3. CERAMIC SOLID
K4		1. T/C SOLID 2. SIC SOLID 3. CARBON RING	S2		1. T/C SOLID 2. SIC SOLID 3. CERAMIC SOLID
K5		1. T/C SOLID 4. T/C COATED 2. SIC SOLID 5. CERAMIC COATED 3. CERAMIC SOLID 6. STELLITE COATED	S3		1. T/C SOLID 4. T/C COATED 2. SIC SOLID 5. CERAMIC COATED 3. CERAMIC SOLID 6. STELLITE COATED
K6		1. CARBON/SOLID 2. T/C SOLID 3. SIC SOLID 4. CERAMIC SOLID	S4		1. T/C SOLID 4. T/C COATED 2. SIC SOLID 5. CERAMIC COATED 3. CERAMIC SOLID 6. STELLITE COATED
K7		1. T/C SOLID 2. SIC SOLID 3. CARBON RING	S5		1. T/C SOLID 2. SIC SOLID 3. CARBON RING
K8		1. T/C SOLID 4. T/C COATED 2. SIC SOLID 5. CERAMIC COATED 3. CERAMIC SOLID 6. STELLITE COATED	S6		1. CARBON/SOLID 2. T/C SOLID 3. SIC SOLID 4. CERAMIC SOLID
K9		1. CARBON/SOLID 2. TC SOLID 3. SIC SOLID 4. CERAMIC SOLID	S7		1. CARBON SOLID
K10		1. CARBON/SOLID 2. TC SOLID 3. SIC SOLID 4. CERAMIC SOLID	S8		1. T/C RING 2. SIC SOLID 3. CARBON RING
K11		1. T/C RING 2. SIC SOLID 3. CARBON RING	S9		1. T/C RING 2. SIC SOLID 3. CARBON RING
K12		1. T/C SOLID 2. SIC SOLID 3. CERAMIC SOLID	L1		1. SIC SOLID 2. CERAMIC SOLID 3. T/C COATED 4. CERAMIC COATED
K13		1. CARBON/SOLID 2. T/C SOLID 3. SIC SOLID 4. CERAMIC SOLID	L2		1. T/C SOLID 4. T/C COATED 2. SIC SOLID 5. CERAMIC COATED 3. CERAMIC SOLID
K14		1. T/C RING 2. SIC RING 3. CARBON RING	L3		1. T/C SOLID 2. SIC SOLID 3. CARBON SOLID
K15		1. T/C SOLID 2. SIC SOLID 3. CERAMIC SOLID	L4		1. T/C SOLID 2. SIC SOLID 3. CERAMIC SOLID

Composition of Common Metal

MATERIAL	COMPOSITION(% OF EACH ELEMENT BY WEIGHT)
17-4PH	15.5 – 17.5 Chrome, 3 – 5 Copper, 72–78 Iron, <.07 Charbon, < 1 MANGANESE, < .04 Phosphorus, < .03 Sulfur, < 1 Silicon, .15–45 Columbium plus Titaninum,.15–45
SUS 304	18–20 Chrome, 8–12 Nickel, <.08 Carbon, 64–70 Iron,<1 Silicon, <2 Manganese,<.030 Sulfur<.045 Phosphorus
AM-350	75 iron,16.5 Chromium, 4.3 Nickel, 2.75 Molybdenum,.8 Manganese, .25 Silicon,.1 Nitrgen,.08 Carbon
SUS 316	16–18 Chrome, 10–14 Nickel, < .08 Carbon, 62–71 Iron, < 1 Silicon, < 2 Manganese, 2 – 3 Molybdenum, < .030 Sulfur, < .045 Phosphorus
ALLOY-20	19–21 Chrome, 32.5–35 Nickel,<.07 Carbon, 37–43 Iron,<1 Silicon, <2 Manganese, 2–3 Molybdenum, 3–4 Copper,<.035 Phosporus <.035 Sulfur, <1 Columbium and Titanium
Hastelloy C	50 – 63 Nickel, 14.5 – 16.5 Chrome, < .08 Carbon, 4–7 Iron, < 1 Silicon, < 1 Manganese, 15 – 17 Molybdenum, 3 – 4.5 Tungasten, < 2.50 Cobalt, < .04 Phosphorus, < .03 Sulfur, < .35 Vanadium
Hastelloy B	58 – 70 Nickel, < 1 Chrome, < .05 Carbon, 4–7 Iron, < 1 Silicon, < 1 Manganese, 26–30 Molybdenum, .2 – .6 Vanadium, < .04 Phosphorus, < .03 Sulfur, < 2.5 Cobalt
Inconel 600	72 Nickel (with Cobalt), 14 – 17 Chromium, 6 – 10 Iron, < .15 Carbon, < 1 Manganese, < .015 Sulfur, < .05 Silicon, < .5 Copper
Inconel 718	50 – 55 Nickel (with Cobalt), 14 – 19 Chromium, 12 – 24 Iron, 4.75–5.5 Columbium and Tantalum, 2.8–3.3 Molybdenum, .65 – 1.15 Titanium, .2–.8 Aluminum, < 1 Colbalt, < .3 Copper, .006 Boron, < .015 Sulfur
Titanium	99.2 Titanium, <.10 Carbon, <.2 Nitrogren, <.15 Hydrogen
Bronze	78–82 Copper, 9 – 11 Tin, 8 – 11 Lead, < .8 Zinc, < .15 Iron, < .55 Antimony, < 1.0 Nickel, < .08 Sulfur, < .15 Phosphorus, < .005 Aluminum, < .005 Cobalt
Monel	63–72 Nickel, 24–31 Copper, < .30 Carbon, < 2.50 Iron, < .50 Silicon, < 2 Manganese, < .024 Sulfur, Trace of Cobalt
Nickel	99 Nickel (plus Cobalt), < .40 Iron, < .35 Silicon, < .15 Carbon, < .35 Manganese, < .01 Vanadium
Tantalum	99.8 Tantalum, .005 Nickel,.005 Carbon, .01 Iron, .03 Tungsten, .02 Cobalt, .03 Molybdenum,.002 Vanadium

Metal Bellows Seal의 특성

일반적으로 Mechanical Seal(Pusher Type)에서 Spring의 역할은 섭동면의 압축과 균형을 유지하기 위해 사용된다. 그러나 Metal Bellows Seal (Nonpusher type)의 경우 필요한 하중을 Spring 대신 Bellows를 사용함으로 다음과 같은 특징을 가지고 있다.



1. 정밀성이 높다.

Bellows 자체형상이 Spring역할을 하므로 일정한 면압과 균형을 이루어 완벽한 Sealing을 한다.

2. 진동과 유연성이 탁월하다.

기밀성이 높은 Bellows를 사용함으로 진동흡수력이 뛰어나 Run out 및 End Play에 적응력이 우수하다.

3. 부품이 간소하다.

Spring Seal 처럼 여러 부품이 조합되어있지 않아 구조가 간결하고 설치가 용이하다.

4. 다양한 온도 조건에 적합하다.

Bellows는 열팽창 계수가 작으므로 극저온 혹은 극한온도에 사용이 가능하다.

5. 고압에 적절하다.

Bellows자체에서 유체역학적 Balance를 잡아주는 Balanced Seal로서 고압에서도 부하를 작게 하여 수명을 연장시킨다.

6. 기계장치 보호역할 수행 (Sleeve 불필요)

Bellows seal은 Hang up이 발생되지 않아서 Shaft의 마모나 부식을 일으키지 않으므로 Shaft를 보호하는 Sleeve를 장착할 필요가 없다.

7. 부식성 유체에 적합

부식성이 강한 유체에 대항 Hastelloy 276과 같은 박판으로 Bellows를 제작함으로서 우수한 성능을 발휘한다.

8. Hang up이 발생되지 않는다.

Spring Seal (Pusher Type)은 유체의 압력에 의해 Spring이나 O-Ring(dynamic)이 움직임으로 인해 Leakage가 발생되나, Bellows Seal은 O-Ring(static)이 움직이지 않으므로 안정적으로 회전하여 Hang up이 발생되지 않아 Seal의 수명은 연장시킨다.

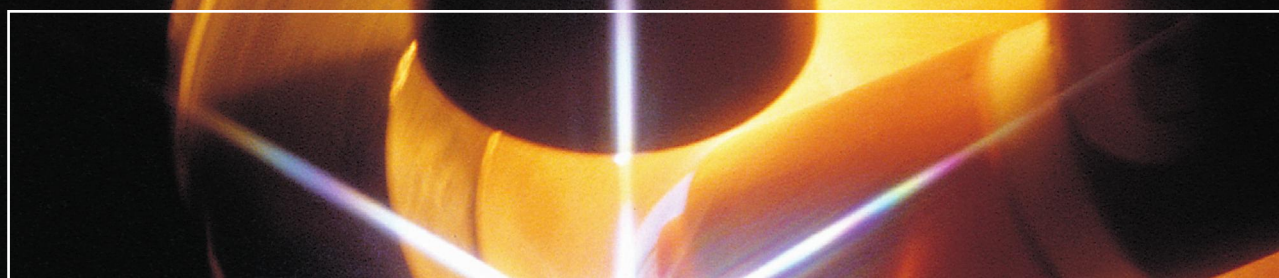
9. Pumping Screw 역할수행

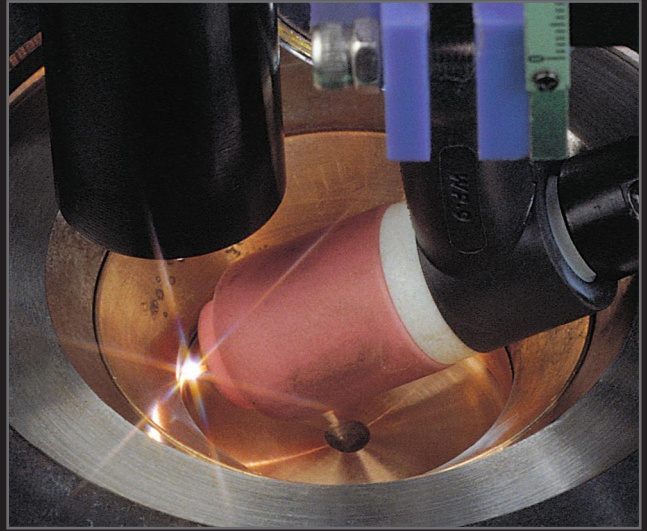
Bellows 자체가 Screw역할을 함으로 Slurry유체에 효과적으로 대처할 수 있고, Flushing도 원활하도록 도와준다.

10. Seal Face 부하

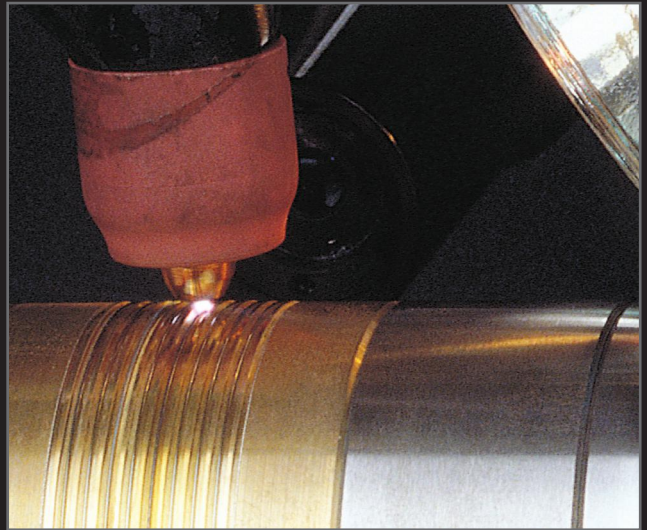
자체 Balance역할을 함으로 고압에서도 Seal Face의 부하를 적게하여 수명을 연장시킨다.

KOREA SEAL LINE CO., LTD.

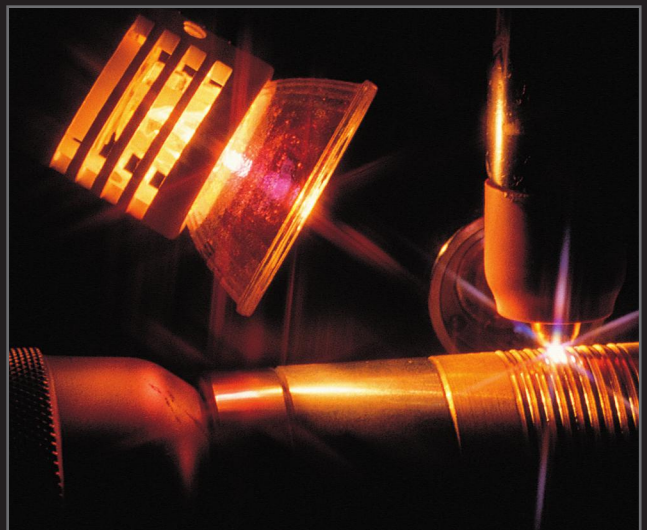




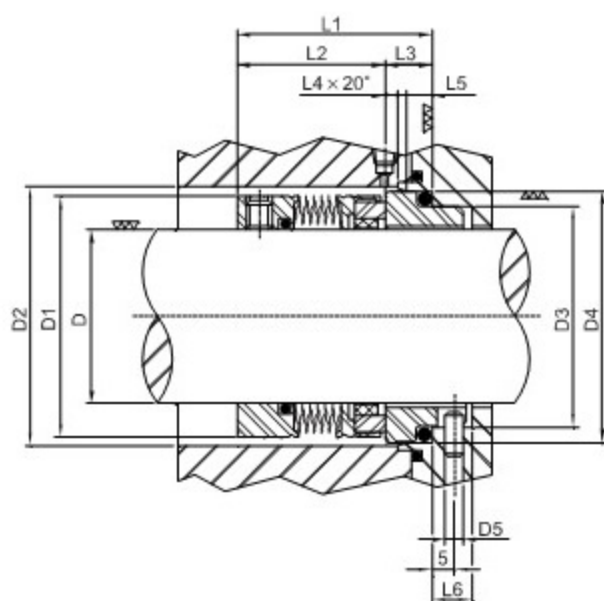
Bellows ID Plasma Welding



Bellows OD Plasma Welding



Bellows OD Plasma Welding

MBS TYPEMetal bellows seal design **DIN** standard**Application Range**

Max. pressure 23kg/cm²
 Max. temperature ~ +230°C
 Max. viscosity 1000cp
 Slurry 0.5%max

Particular's of type

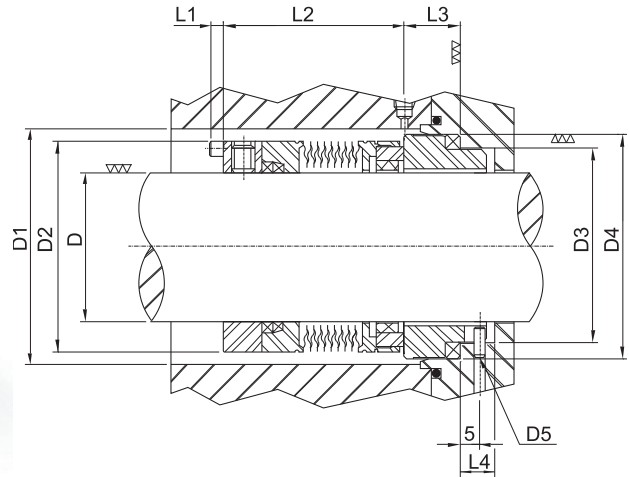
Metal bellows type
 Never hang up(static)
 Simple construction
 Excellence precision

Compatible Seal Liquid

Chemical processing
 Oil & refinery pump
 Power plant etc,

(MM)

SEAL	D	D1	D2	D3	D4	D5	L1	L2	L3	L4	L5	L6
SIZE	h6		MIN.	H11	H8		±0.5					
M018	18	31.8	34	27	33	3	37.5	27.5	10	2	5	9
M020	20	33.3	36	29	35	3	37.5	27.5	10	2	5	9
M022	22	36.5	38	31	37	3	37.5	27.5	10	2	5	9
M024	24	38.1	40	33	39	3	40.0	30.0	10	2	5	9
M025	25	39.3	41	34	40	3	40.0	30.0	10	2	5	9
M028	28	42.2	44	37	43	3	42.5	32.5	10	2	5	9
M030	30	44.2	46	39	45	3	42.5	32.5	10	2	5	9
M032	32	46.0	48	42	48	3	42.5	32.5	10	2	5	9
M033	33	47.2	49	42	48	3	42.5	32.5	10	2	5	9
M035	35	49.2	51	44	50	3	42.5	32.5	10	2	5	9
M038	38	52.4	58	49	56	4	45.0	34.0	11	2	6	9
M040	40	55.5	60	51	58	4	45.0	34.0	11	2	6	9
M043	43	58.7	63	54	61	4	45.0	34.0	11	2	6	9
M045	45	58.7	65	56	63	4	45.0	34.0	11	2	6	9
M048	48	61.9	68	59	66	4	45.0	34.0	11	2	6	9
M050	50	65.1	70	62	70	4	47.5	34.5	13	2.5	6	9
M053	53	68.2	73	65	73	4	47.5	34.5	13	2.5	6	9
M055	55	71.4	75	67	75	4	47.5	34.5	13	2.5	6	9
M058	58	74.6	83	70	78	4	52.5	39.5	13	2.5	6	9
M060	60	74.6	85	72	80	4	52.5	39.5	13	2.5	6	9
M063	63	80.9	88	75	83	4	52.5	39.5	13	2.5	6	9
M065	65	84.1	90	77	85	4	52.5	39.5	13	2.5	6	9
M068	68	87.3	93	81	90	4	52.5	37.2	13	2.5	7	9
M070	70	87.3	95	83	92	4	60.0	44.7	15.3	2.5	7	9
M075	75	95.2	104	88	97	4	60.0	44.7	15.3	2.5	7	9
M080	80	101.6	109	95	105	4	60.0	44.3	15.7	3	7	9
M085	85	104.8	114	100	110	4	60.0	44.3	15.7	3	7	9
M090	90	111.1	119	105	115	4	65.0	49.3	15.7	3	7	9
M095	95	114.3	124	110	120	4	65.0	49.3	15.7	3	7	9
M100	100	120.6	129	115	125	4	65.0	49.3	15.7	3	7	9
M110	110	133.3	139	126	135	4	65.0	49.3	15.7	3	7	9
M120	120	142.9	153	141	153	4	68.4	51.9	16.5	3	9.5	9

HBS TYPEMetal bellows seal design **DIN** standard**Application Range**

Max. pressure 23kg/cm²
 Max. temperature ~ +400°C
 Max. viscosity 1000cp
 Slurry 0.5%max

Particular's of type

Metal bellows type,
 Graphite packing used,
 High temperature

Compatible Seal Liquid

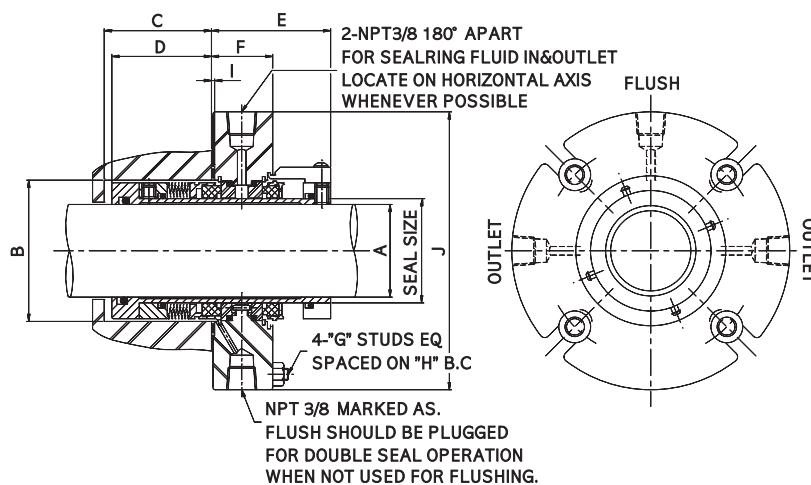
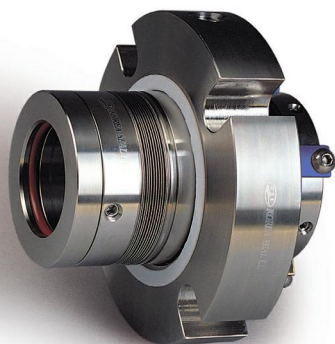
Hot molten fluid
 Hot oil pump
 High temperature refinery

(MM)

D	D1	D2	D3	D4	D5	L1	L2	L3	L4
±.001	±.005		+0.01 -0.00	+0.05 -0.00					
1.125"	1.937"	1.687"	1.515"	1.750"	0.12"	0.11"	1.94"	0.50"	0.354"
1.250"									
1.375"	2.250"	2.000"	1.765"	2.000"	0.12"	0.14"	2.06"	0.50"	0.354"
1.500"	2.375"	2.125"	1.890"	2.250"	0.16"	0.14"	2.06"	0.56"	0.354"
1.625"									0.354"
1.750"	2.625"	2.437"	2.140"	2.500"	0.16"	0.14"	2.06"	0.56"	0.354"
1.875"	2.750"	2.562"	2.265"	2.625"	0.16"	0.14"	2.06"	0.56"	0.354"
2.000"	2.875"	2.687"	2.390"	2.750"	0.16"	0.14"	2.06"	0.56"	0.354"
2.125"	3.000"	2.812"	2.515"	2.875"	0.16"	0.14"	2.31"	0.56"	0.354"
2.250"	3.250"	2.937"	2.765"	3.125"	0.16"	0.14"	2.31"	0.56"	0.354"
2.375"	3.375"	3.062"	2.890"	3.250"	0.16"	0.14"	2.31"	0.56"	0.354"
2.500"	3.500"	3.250"	3.015"	3.375"	0.16"	0.14"	2.31"	0.56"	0.354"
2.625"	3.625"	3.375"	3.140"	3.500"	0.16"	0.16"	2.31"	0.56"	0.354"
2.750"	3.750"	3.500"	3.265"	3.625"	0.16"	0.16"	2.31"	0.56"	0.354"
2.875"	3.875"	3.625"	3.390"	3.750"	0.16"	0.16"	2.31"	0.56"	0.354"
3.000"	4.000"	3.750"	3.515"	3.875"	0.16"	0.16"	2.31"	0.56"	0.354"
3.125"	4.188"	4.000"	3.702"	4.062"	0.16"	0.19"	2.75"	0.56"	0.354"
3.250"									
3.375"	4.437"	4.250"	3.953"	4.312"	0.16"	0.19"	2.75"	0.56"	0.354"
3.500"	4.562"	4.375"	4.077"	4.437"	0.16"	0.19"	2.75"	0.56"	0.354"
3.625"									
3.750"	4.812"	4.625"	4.327"	4.687"	0.16"	0.19"	2.75"	0.56"	0.354"
3.875"	4.937"	4.750"	4.452"	4.812"	0.16"	0.19"	2.75"	0.56"	0.354"
4.000"									
4.125"	5.312"	5.062"	4.702"	5.187"	0.16"	0.19"	2.75"	0.62"	0.354"
4.250"	5.437"	5.187"	4.827"	5.312"	0.16"	0.19"	2.75"	0.62"	0.354"
4.375"									
4.500"	5.688"	5.437"	5.007"	5.562"	0.16"	0.19"	2.75"	0.62"	0.354"

SBS TYPE

Single cartridge metal bellows seal design standard

**Application Range**

Max. pressure 20kg/cm²
 Max. temperature ~ +200°C
 Max. viscosity 1000cp
 Slurry 3%max

Particular's of type

Ease of installation
 Metal bellows type
 Extreme corrosion resistance
 Cartridge mounted

Compatible Seal Liquid

Chemical processing
 Mixer, Agitator
 Oil & refinery pump

(MM)

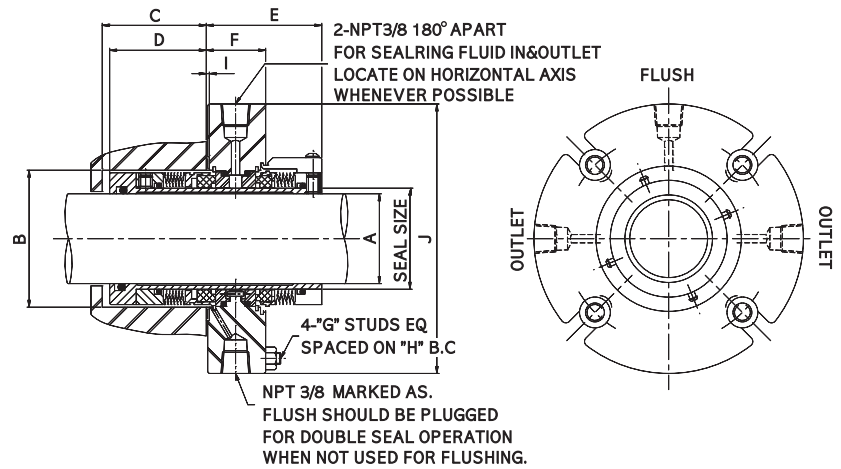
Seal Size	A	B		C	D	E	F	G	H	I	J
+0.00 -0.05	±0.025	MIN.	MAX.	MIN.	±0.5			MIN.			±0.5
M028	25	44	49	45.5	43.0	50.8	25.8	70.0	11.2	0.8	95
M032	28	48	52	45.5	43.0	50.8	25.8	76.2	14.3	0.8	96
M035	32	51	55	45	42.5	50.8	25.8	79.4	14.3	0.8	108
M040	35	58	65	47	44.5	50.8	25.8	95.2	11.2	0.8	120
M045	40	61	68	47	44.5	50.8	25.8	95.2	14.3	0.8	120
M050	45	67	74	50	47.5	50.8	25.8	98.4	14.3	0.8	127
M055	50	73	84	50	47.5	50.8	25.8	111.1	17.5	0.8	112
M060	55	77	87	50	47.5	508.5	25.8	117.54	17.5	0.8	165
M065	60	86	96	55	52.5	53.1	28.2	127.0	17.5	0.8	168
M070	65	89	100	55	52.5	53.4	28.2	146.0	20.7	0.8	184

(INCH)

Seal Size	A	B		C	D	E	F	G	H	I	J
+0.000 -0.002	±0.001	MIN.	MAX.	MIN.	±0.5			MIN			
1.125"	1.000"	1.750"	1.875"	1.78"	1.68"	2.00"	1.02"	2.75"	.375"	.03"	2.75"
1.250"	1.125"	1.750"	2.000"	1.75"	1.68"	2.00"	1.02"	3.00"	.500"	.03"	3.00"
1.375"	1.250"	2.000"	2.125"	1.97"	1.88"	2.00"	1.02"	3.12"	.500"	.03"	3.12"
1.500"	1.375"	2.000"	2.250"	1.97"	1.88"	2.00"	1.02"	3.25"	.375"	.03"	3.25"
1.625"	1.500"	2.250"	2.500"	1.97"	1.88"	2.00"	1.02"	3.75"	.375"	.03"	3.75"
1.750"	1.625"	2.375"	2.625"	1.97"	1.88"	2.00"	1.02"	3.75"	.500"	.03"	3.75"
1.875"	1.750"	2.500"	2.750"	1.97"	1.88"	2.00"	1.02"	3.75"	.500"	.03"	3.75"
2.000"	1.875"	2.625"	2.875"	1.97"	1.88"	2.00"	1.02"	3.89"	.500"	.03"	3.88"
2.125"	2.000"	2.750"	3.000"	1.97"	1.88"	2.00"	1.02"	4.12"	.625"	.03"	4.12"
2.250"	2.125"	2.875"	3.250"	1.97"	1.88"	2.00"	1.02"	4.38"	.625"	.03"	4.38"
2.375"	2.250"	3.000"	3.375"	1.97"	1.88"	2.00"	1.02"	4.62"	.625"	.03"	4.62"
2.500"	2.375"	3.250"	3.625"	2.16"	2.06"	2.09"	1.11"	5.00"	.625"	.03"	5.00"
2.625"	2.500"	3.375"	3.750"	2.16"	2.06"	2.09"	1.11"	5.00"	.625"	.03"	5.00"
2.750"	2.625"	3.500"	3.675"	2.16"	2.06"	2.09"	1.11"	5.75"	.750"	.03"	5.75"

DBS TYPE

Double cartridge metal bellows seal design standard

**Application Range**

Max. pressure 20kg/cm²
 Max. temperature ~ +250°C
 Max. viscosity 1000cp
 Slurry 3%max

Particular's of type

Ease of installation
 Metal bellows type
 Extreme corrosion resistance
 Cartridge mounted

Compatible Seal Liquid

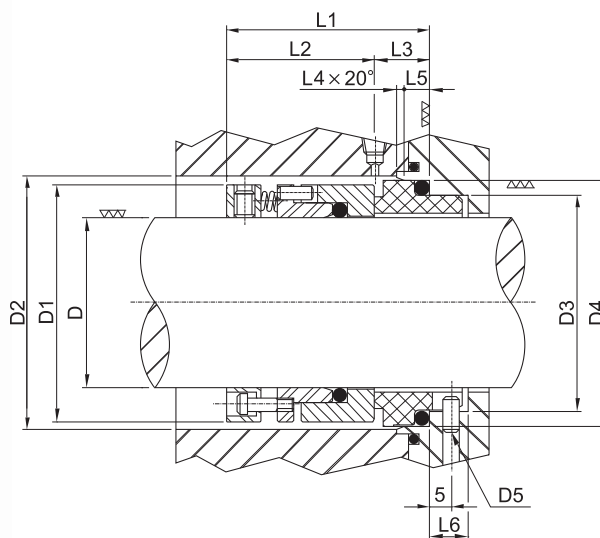
Chemical processing
 Mixer, Agitator
 Oil & refinery pump

(MM)

Seal Size	A	B		C	D	E	F	G	H	I	J
+0.00 -0.05	±0.025	MIN.	MAX.	MIN.	±0.5			MIN.			±0.5
M028	25	44	49	45.5	43.0	50.8	25.8	70.0	11.2	0.8	95
M032	28	48	52	45.5	43.0	50.8	25.8	76.2	14.3	0.8	98
M035	32	51	55	45	42.5	50.8	25.8	79.4	14.3	0.8	108
M040	35	58	65	47	44.5	50.8	25.8	95.2	11.2	0.8	120
M045	40	61	68	47	44.5	50.8	25.8	95.2	14.3	0.8	120
M050	45	67	74	50	47.5	50.8	25.8	98.4	14.3	0.8	127
M055	50	73	84	50	47.5	50.8	25.8	111.1	17.5	0.8	112
M060	55	77	87	50	47.5	50.8	25.8	117.5	17.5	0.8	165
M065	60	86	96	55	52.5	53.1	28.2	127.0	17.5	0.8	168
M070	65	89	100	55	52.5	53.1	28.2	146.0	20.7	0.8	184

(INCH)

Seal Size	A	B		C	D	E	F	G	H	I	J
+0.000 -0.002	±0.001	MIN.	MAX.	MIN.	±0.5			MIN			
1.125"	1.000"	1.750"	1.875"	1.78"	1.68"	2.00"	1.02"	2.75"	.375"	.03"	2.75"
1.250"	1.125"	1.750"	2.000"	1.75"	1.68"	2.00"	1.02"	3.00"	.500"	.03"	3.00"
1.375"	1.250"	2.000"	2.125"	1.97"	1.88"	2.00"	1.02"	3.12"	.500"	.03"	3.12"
1.500"	1.375"	2.000"	2.250"	1.97"	1.88"	2.00"	1.02"	3.25"	.375"	.03"	3.25"
1.625"	1.500"	2.250"	2.500"	1.97"	1.88"	2.00"	1.02"	3.75"	.375"	.03"	3.75"
1.750"	1.625"	2.375"	2.625"	1.97"	1.88"	2.00"	1.02"	3.75"	.500"	.03"	3.75"
1.875"	1.750"	2.500"	2.750"	1.97"	1.88"	2.00"	1.02"	3.75"	.500"	.03"	3.75"
2.000"	1.875"	2.625"	2.875"	1.97"	1.88"	2.00"	1.02"	3.89"	.500"	.03"	3.88"
2.125"	2.000"	2.750"	3.000"	1.97"	1.88"	2.00"	1.02"	4.12"	.625"	.03"	4.12"
2.250"	2.125"	2.875"	3.250"	1.97"	1.88"	2.00"	1.02"	4.38"	.625"	.03"	4.38"
2.375"	2.250"	3.000"	3.375"	1.97"	1.88"	2.00"	1.02"	4.62"	.625"	.03"	4.62"
2.500"	2.375"	3.250"	3.625"	2.16"	2.06"	2.09"	1.11"	5.00"	.625"	.03"	5.00"
2.625"	2.500"	3.375"	3.750"	2.16"	2.06"	2.09"	1.11"	5.00"	.625"	.03"	5.00"
2.750"	2.625"	3.500"	3.675"	2.16"	2.06"	2.09"	1.11"	5.75"	.750"	.03"	5.75"

K1A TYPEInside unbalanced seal design **DIN** standard**Application Range**

Max. pressure 10kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 300cp
 Slurry 0.5%max

Particular's of type

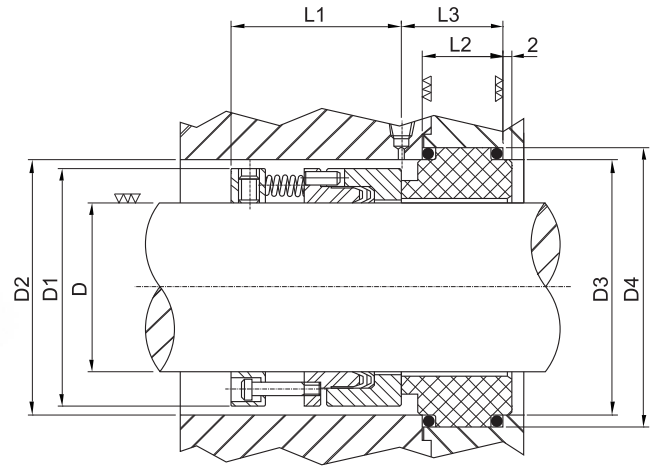
Multi spring type
 Variety elastomers
 Unbalanced seal
 General seal

Compatible Seal Liquid

Variable industrial fluid
 Centrifugal pump, etc

(MM)

SEAL SIZE	D h6	D1	D2 MIN.	D3 H11	D4 H8	D5	L1 ±0.5	L2	L3	L4	L5	L6
M018	18	32	34	27	33	3	44.5	35	9.5	2	5	9
M020	20	34	36	29	35	3	44.5	35	9.5	2	5	9
M022	22	36	38	31	37	3	44.5	35	9.5	2	5	9
M024	24	38	40	33	39	3	45	35	10	2	5	9
M025	25	39	41	34	40	3	45	35	10	2	5	9
M028	28	42	44	37	43	3	45	35	10	2	5	9
M030	30	44	46	39	45	3	45	35	10	2	5	9
M032	32	46	48	42	48	3	45	35	10	2	5	9
M033	33	47	49	42	48	3	45	35	10	2	5	9
M035	35	49	51	44	50	3	45	35	10	2	5	9
M038	38	54	58	49	56	4	48	35	13	2	6	9
M040	40	56	60	51	58	4	48	35	13	2	6	9
M043	43	59	63	54	61	4	56	43	13	2	6	9
M045	45	61	65	56	63	4	56	43	13	2	6	9
M048	48	64	68	59	66	4	56	43	13	2	6	9
M050	50	66	70	62	70	4	58.5	43	15.5	2.5	6	9
M053	53	69	73	65	73	4	58.5	43	15.5	2.5	6	9
M055	55	71	75	67	75	4	58.5	43	15.5	2.5	6	9
M058	58	78	83	70	78	4	59	43	16	2.5	6	9
M060	60	80	85	72	80	4	59	43	16	2.5	6	9
M063	63	83	88	75	83	4	59	43	16	2.5	6	9
M065	65	85	90	77	85	4	59	43	16	2.5	6	9
M068	68	88	93	81	90	4	59	43	16	2.5	7	9
M070	70	90	95	83	92	4	62	43	19	2.5	7	9
M075	75	95	104	88	97	4	63	44	19	2.5	7	9
M080	80	100	109	95	105	4	63	44	19	3	7	9
M085	85	105	114	100	110	4	63	44	19	3	7	9
M090	90	110	119	105	115	4	63	44	19	3	7	9
M095	95	115	124	110	120	4	63	44	19	3	7	9
M100	100	120	129	115	125	4	63	44	19	3	7	9

K1B TYPEInside unbalanced seal design **ISO** standard**Application Range**

Max. pressure 10kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 300cp
 Slurry 0.5%max

Particular's of type

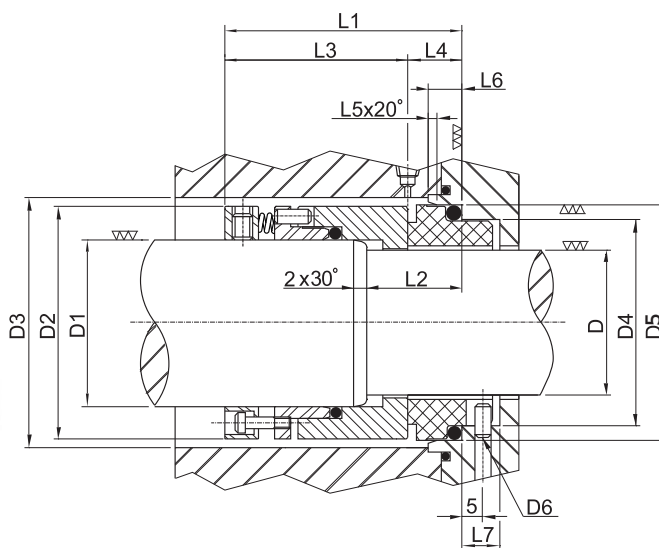
Multi spring type
 Teflon V-cup used
 Unbalanced seal
 General seal

Compatible Seal Liquid

Variable industrial fluid
 Centrifugal pump
 Acid, solvent liquid, etc

(MM)

SEAL SIZE	D h6	D1	D2 MIN.	D3 H11	D4 H8	L1 ±0.5	L2 ±0.05	L3
M020	20	34	36	36	42	35	18	23
M022	22	36	38	38	44	35	18	23
M025	25	39	41	41	47	35	18	23
M028	28	42	44	44	50	35	18	23
M030	30	44	46	46	52	35	18	23
M032	32	46	48	48	54	35	18	23
M035	35	49	51	51	57	35	18	23
M038	38	54	58	58	64	35	20	25
M040	40	56	60	60	66	35	20	25
M042	42	58	62	62	68	43	20	25
M045	45	61	65	65	71	43	20	25
M048	48	64	68	68	74	43	20	25
M050	50	66	70	70	76	43	20	25
M052	52	68	72	72	78	43	20	25
M055	55	71	75	75	81	43	20	25
M058	58	78	83	83	89	43	22	28
M060	60	80	85	85	92	43	22	28
M062	62	83	87	87	94	43	22	28
M065	65	85	90	90	97	43	22	28
M068	68	88	93	93	100	43	24	30
M070	70	90	95	95	102	43	24	30
M075	75	95	104	104	111	44	24	30
M080	80	100	109	109	116	44	25	31
M085	85	105	114	114	121	44	25	31
M090	90	110	119	119	126	44	25	31
M095	95	115	124	124	131	44	25	31
M100	100	120	129	129	137	44	25	31
M110	110	130	139	139	147	44	25	31
M120	120	145	150	150	158	47	30	41
M130	130	155	160	160	168	47	30	41
M140	140	165	175	175	183	47	30	41
M150	150	175	190	190	198	47	30	41

K2A TYPEInside balanced seal design **DIN** standard**Application Range**

Max. pressure 30kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 300cp
 Slurry 0.5%max

Particular's of type

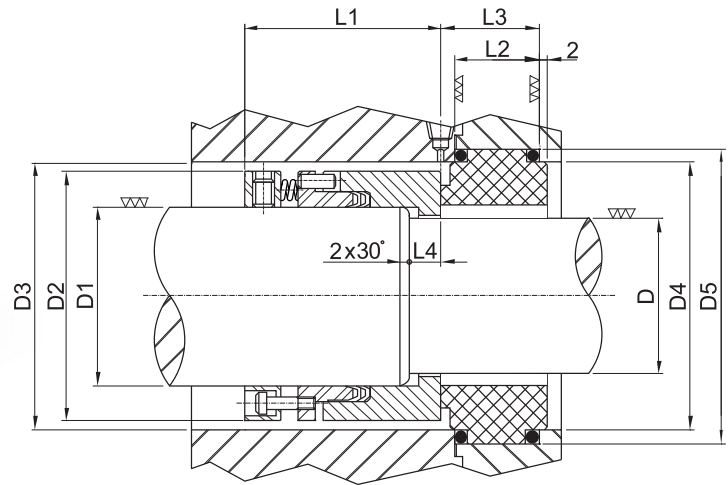
Multi spring type
 Balanced seal
 High pressure

Compatible Seal Liquid

Variable industrial fluid
 Hight pressure pump
 Non crystallizing acid, water, etc

(MM)

SEAL SIZE	D h6	D1 h6	D2	D3 MIN.	D4 H11	D5 H8	D6	L1 ±0.5	L2 ±0.5	L3	L4	L5	L6	L7
M022	18	22	36	38	27	33	3	54.5	20	45	9.5	2	5	9
M024	20	24	38	40	29	35	3	53.5	20	44	9.5	2	5	9
M026	22	26	40	42	31	37	3	53.5	20	44	9.5	2	5	9
M028	24	28	42	44	33	39	3	54	20	44	10	2	5	9
M030	25	30	44	46	34	40	3	54	20	44	10	2	5	9
M033	28	33	47	49	37	43	3	54	20	44	10	2	5	9
M035	28	35	49	51	39	45	3	54	20	44	10	2	5	9
M038	33	38	54	58	42	48	4	54	20	44	10	2	5	9
M040	35	40	56	60	44	50	4	54	20	44	10	2	5	9
M043	38	43	59	63	49	56	4	65	23	52	13	2	6	9
M045	40	45	61	65	51	58	4	65	23	52	13	2	6	9
M048	43	48	64	68	54	61	4	65	23	52	13	2	6	9
M050	45	50	66	70	56	63	4	65	23	52	13	2.5	6	9
M053	48	53	69	73	59	66	4	65	23	52	13	2.5	6	9
M055	50	55	71	75	62	70	4	67.5	25	52	15.5	2.5	6	9
M058	53	58	78	83	65	73	4	67.5	25	52	15.5	2.5	6	9
M060	55	60	80	85	67	75	4	67.5	25	52	15.5	2.5	6	9
M063	58	63	83	88	70	78	4	68	25	52	16	2.5	6	9
M065	60	65	85	90	72	80	4	68	25	52	16	2.5	6	9
M068	63	68	88	93	75	83	4	68	25	52	16	2.5	6	9
M070	65	70	90	95	77	85	4	68	25	52	16	2.5	6	9
M075	70	75	95	104	83	92	4	72	28	53	19	2.5	7	9
M080	75	80	100	109	88	97	4	72	28	53	19	2.5	7	9
M085	80	85	105	114	95	105	4	72	28	53	19	3	7	9
M090	85	90	110	119	100	110	4	72	28	53	19	3	7	9
M095	90	95	115	124	105	115	4	72	28	53	19	3	7	9
M100	95	100	120	129	110	120	4	72	28	53	19	3	7	9

K2B TYPEInside balanced seal design **ISO** standard**Application Range**

Max. pressure 30kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 300cp
 Slurry 0.5%max

Particular's of type

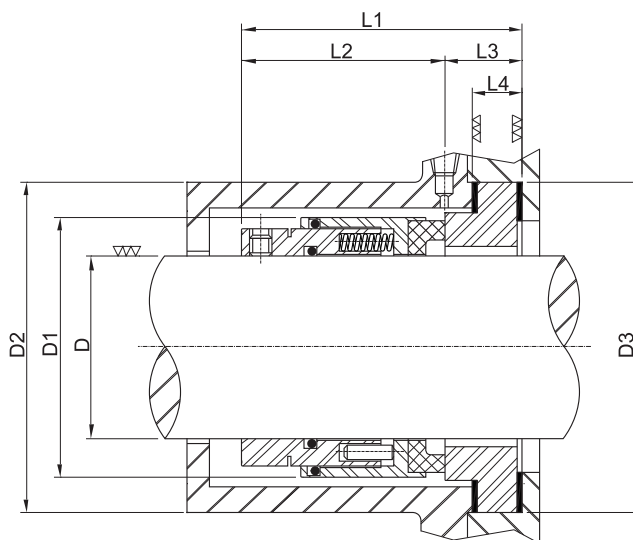
Multi spring type
 Balanced seal
 High pressure

Compatible Seal Liquid

Variable industrial fluid
 High pressure pump
 Non crystallizing acid, solvent, etc

(MM)

SEAL SIZE	D h6	D1 h6	D2	D3 MIN.	D4 H11	D5 H8	L1 ±0.5	L2 ±0.05	L3	L4
M020	16	20	34	36	36	42	45	18	23	8
M022	18	22	36	38	38	44	45	18	23	8
M025	21	25	39	41	41	47	44	18	23	8
M028	24	28	42	36	44	50	44	18	23	8
M030	25	30	44	46	46	52	44	18	23	8
M032	27	32	46	48	48	54	44	18	23	8
M035	30	35	49	51	51	57	44	18	23	8
M038	33	38	54	58	58	64	44	20	25	8
M040	35	40	56	60	60	66	44	20	25	8
M042	37	42	58	62	62	68	52	20	25	8
M045	40	45	61	65	65	71	52	20	25	8
M048	43	48	64	68	68	74	52	20	25	8
M050	45	50	66	70	70	76	52	20	25	8
M052	47	52	68	72	72	78	52	20	25	8
M055	50	55	71	75	75	81	52	20	25	8
M058	53	58	76	83	83	89	52	22	28	8
M060	55	60	78	85	85	91	52	22	28	8
M062	57	62	80	87	87	94	52	22	28	8
M065	60	65	85	90	90	96	52	22	28	8
M068	63	68	88	93	93	99	52	24	30	8
M070	65	70	90	95	95	101	52	24	30	9
M075	70	75	95	104	104	110	53	24	30	9
M080	75	80	100	109	109	115	53	25	31	9
M085	80	85	105	114	114	120	53	25	31	9
M090	85	90	110	119	119	125	53	25	31	9
M095	90	95	115	124	124	130	53	25	31	9
M100	95	100	120	129	129	135	53	25	31	9
M110	105	110	132	139	139	145	53	25	31	9
M120	110	120	144	150	150	160	53	30	41	9
M130	120	130	154	160	160	170	53	30	41	9
M140	130	140	164	175	175	185	53	30	41	9
M150	140	150	180	190	190	200	53	30	41	9

K3B TYPEInside balanced seal design **ISO** standard**Application Range**

Max. pressure 21kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 300,000cp
 Slurry 7%max

Particular's of type

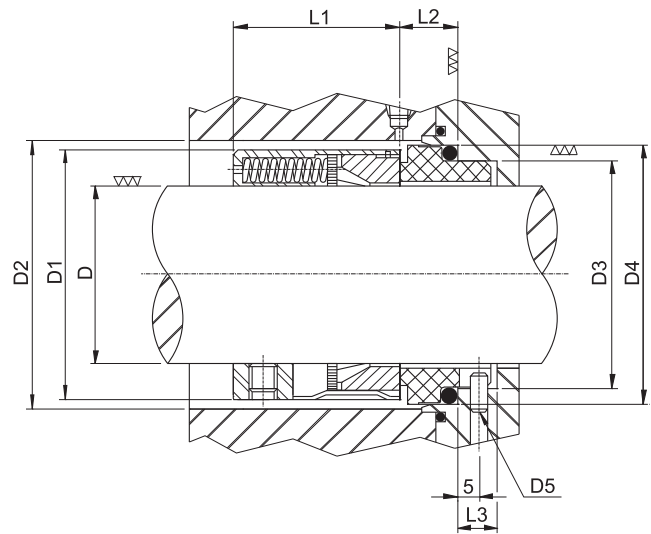
Multi spring type
 Isolated spring seal
 High slurry
 Balanced seal

Compatible Seal Liquid

Crystallizing acid, salt
 High viscosity oil
 High slurry fluid

(MM)

SEAL	D	D1	D2	D3	L1	L2	L3	L4
SIZE	H6		MIN.	H7				±0.03
M020	20	35	43	47.8	61.5	44.5	17	11
M025	25	39.7	47.6	53.5	61.5	44.5	17	11
M028	28	43	50.8	56.7	61.5	44.5	17	11
M030	30	46	52	62.3	61.5	44.5	17	11
M032	32	48	55.5	61.4	61.5	44.5	17	11
M035	35	49.2	55.5	61.4	61.5	44.5	17	11
M038	38	54	62	69.4	61.5	44.5	17	11
M040	40	57.2	65	72.6	61.5	44.5	17	11
M045	45	63.5	71.5	79	61.5	44.5	17	11
M050	50	66.7	78	88.5	62	44.5	17.5	12
M056	55	73	87	95	62	44.5	17.5	12
M060	60	76.2	89	98.8	62	44.5	17.5	12
M065	65	83.5	94	105	62	44.5	17.5	12

K4W TYPEInside unbalanced seal design **DIN** standard**Application Range**

Max. pressure 10kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 300cp
 Slurry 0.5%max

Particular's of type

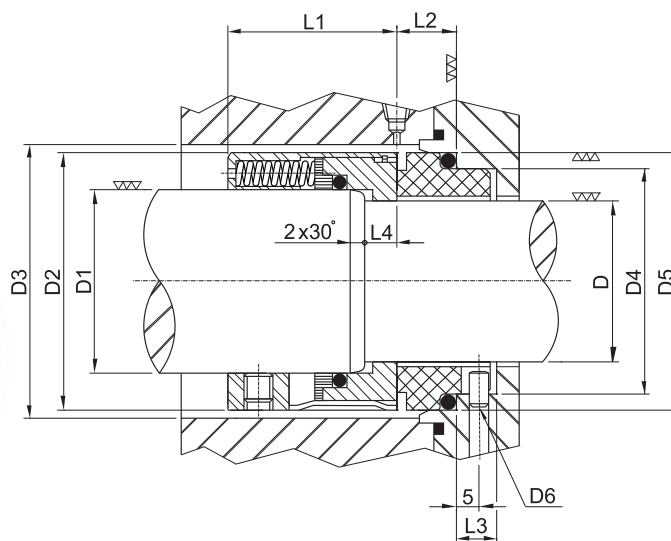
Multi spring type
 Teflon wedge used
 Unbalanced seal

Compatible Seal Liquid

Chemical processing
 Non crystallizing acid,
 Centrifugal pump, etc

(MM)

SEAL	D	D1	D2	D3	D4	D5	L1	L2	L3
SIZE	h6		MIN.	H11	H8		±0,5		
M020	20	34	36	29	35	3	30	9,5	9
M025	25	39	41	34	40	3	30	10	9
M028	28	42	44	37	43	3	30	10	9
M030	30	44	46	39	45	3	30	10	9
M032	32	46	48	42	48	3	30	10	9
M035	35	49	51	44	50	3	30	10	9
M040	40	56	60	51	58	4	30	13	9
M045	45	61	65	56	63	4	30	13	9
M048	48	64	68	59	66	4	34	13	9
M050	50	66	70	62	70	4	34	15,5	9
M055	55	71	75	67	75	4	34	15,5	9
M060	60	78	85	72	80	4	34	16	9
M065	65	83	90	77	85	4	34	16	9
M070	70	90	95	83	92	4	40	19	9
M075	75	95	104	88	97	4	40	19	9
M080	80	100	109	95	105	4	40	19	9
M085	85	105	114	100	110	4	40	19	9
M090	90	110	119	105	115	4	40	19	9
M095	95	115	124	110	120	4	40	19	9
M100	100	120	129	115	125	4	45	19	9

K5A TYPEInside balanced seal design **DIN** standard**Application Range**

Max. pressure 30kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 300cp
 Slurry 0.5%max

Particular's of type

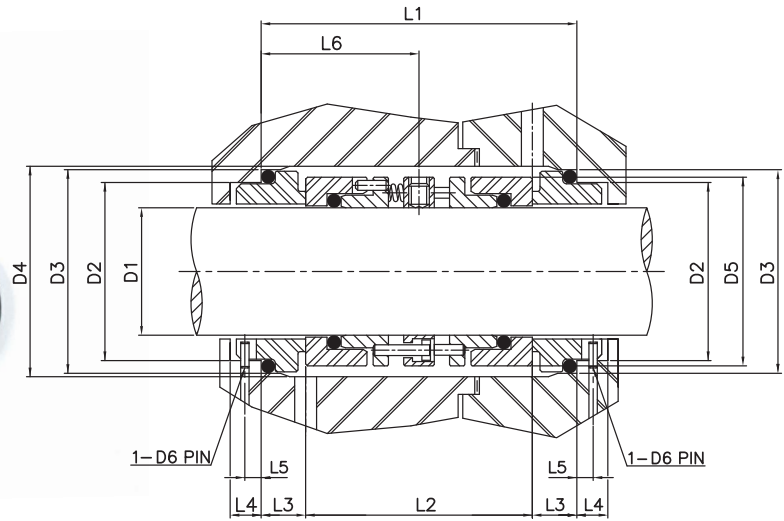
Multi spring type
 Balanced seal
 Teflon wedge or O-ring used
 High pressure

Compatible Seal Liquid

Variable industrial fluid
 High pressure pump
 Non crystallizing acid, solvent etc

(MM)

SEAL	D	D1	D2	D3	D4	D5	D6	L1	L2	L3	L4
SIZE	h6	h6		MIN.	H11	H8		±0.5			
M020	16	20	39	41	23	27	3	37	9.5	9	7
M025	21	25	44	46	30	36	3	37	10	9	7
M028	24	28	46	48	33	39	3	37	10	9	7
M030	25	30	49	51	34	40	3	37	10	9	7
M032	27	32	54	58	36	42	3	37	10	9	7
M035	30	35	56	60	39	45	3	37	10	9	7
M040	35	40	61	65	44	50	4	37	13	9	7
M045	40	45	66	70	51	58	4	41	13	9	7
M048	43	48	69	73	54	61	4	41	13	9	8
M050	45	50	71	75	56	63	4	41	15.5	9	8
M055	50	55	78	85	62	70	4	41	15.5	9	8
M060	55	60	83	90	67	75	4	41	16	9	8
M065	60	65	90	95	72	80	4	41	16	9	8
M070	65	70	95	104	77	85	4	48	19	9	9
M075	70	75	100	109	83	92	4	48	19	9	9
M080	75	80	105	114	88	97	4	48	19	9	9
M085	80	85	110	119	95	105	4	48	19	9	9
M090	85	90	115	124	105	115	4	48	19	9	9
M095	90	95	120	129	110	120	4	54	19	9	9
M100	95	100	125	134	115	125	4	54	19	9	9

SDU TYPEDouble unbalanced seal design **DIN** standard**Application Range**

Max. pressure 10kg/cm²
 Max. temperature ~ +200°C
 Max. viscosity 300cp
 Slurry 5%max

Particular's of type

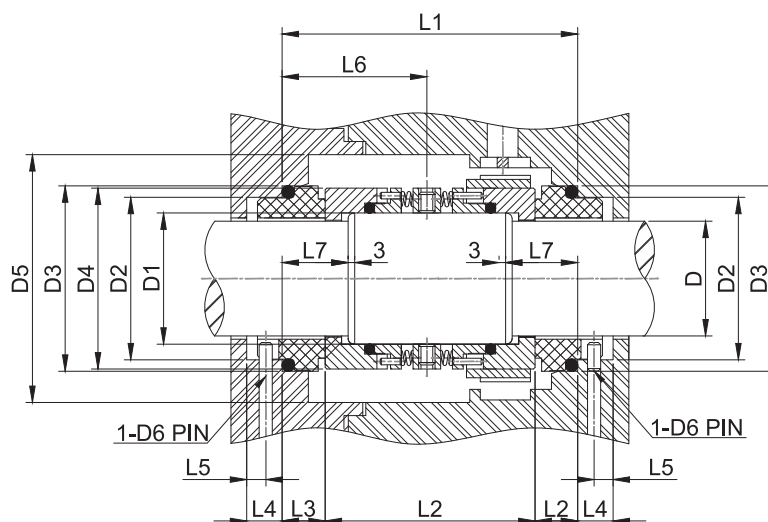
Multi spring type
 Unbalanced
 Double seal

Compatible Seal Liquid

Strongly corrosive fluid
 Non-crystallizing acid
 Low slurry water, etc

(MM)

SEAL	D1	D2	D3	D4	D5	D6	L1	L2	L3	L4	L5	L6
SIZE	h6	H11	H8	MIN.			±0.5					
M022	22	31	37	38	36	3	80	61	9.5	9	5	40
M025	25	34	40	41	39	3	81	61	10	9	5	40.5
M028	28	37	43	44	42	3	81	61	10	9	5	40.5
M030	30	39	45	46	44	3	81	61	10	9	5	40.5
M032	32	42	48	48	46	3	81	61	10	9	5	40.5
M035	35	44	50	51	49	3	81	61	10	9	5	40.5
M040	40	51	58	60	56	4	87	61	13	9	6	43.5
M043	42	54	61	63	59	4	91	65	13	9	6	45.5
M045	45	56	63	65	61	4	91	65	13	9	6	45.5
M048	48	59	66	68	64	4	91	65	13	9	6	45.5
M050	50	62	70	70	66	4	96	65	15.5	9	6	48
M055	55	67	75	75	71	4	96	65	15.5	9	6	48
M060	60	72	80	85	80	4	97	65	16	9	6	48.5
M065	65	77	85	90	85	4	97	65	16	9	6	48.5
M070	70	83	92	95	90	4	103	65	19	9	7	51.5
M075	75	88	97	104	95	4	105	67	19	9	7	52.5
M080	80	95	105	109	100	4	105	67	19	9	7	52.5
M085	85	100	110	114	105	4	105	67	19	9	7	52.5
M090	90	105	115	119	110	4	105	67	19	9	7	52.5
M095	95	110	120	124	124	4	105	67	19	9	7	52.5
M100	100	115	125	129	129	4	105	67	19	9	7	52.5

SDB TYPEDouble balanced seal design **DIN** standard**Application Range**

Max. pressure 30kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 300cp
 Slurry 5%max

Particular's of type

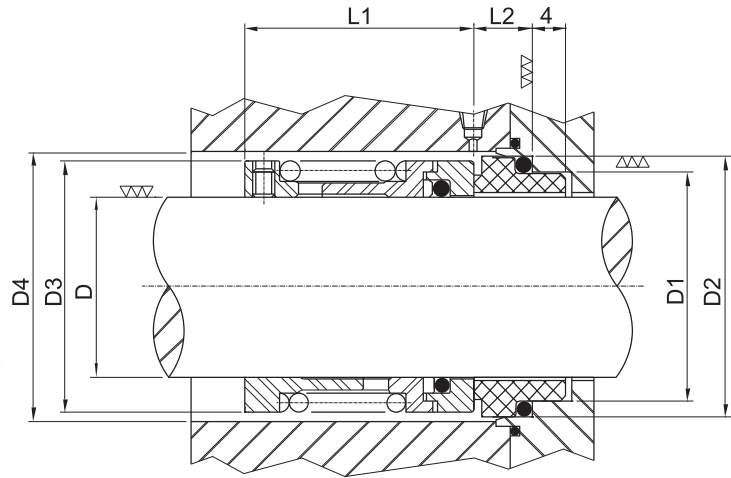
Multi spring type
 Balanced double seal
 Circulating Shroud
 High pressure

Compatible Seal Liquid

Strongly corrosive fluid
 Low lubricant fluid
 High pressure pump

(MM)

SEAL	D1	D2	D3	D4	D5	D6	D7	L1	L2	L3	L4	L5	L6	L7
SIZE	h6	h6	H11	H8		MIN.		±0.5						
M018	18	22	27	33	36	38	3	98	79	9.5	9	5	49	20
M020	20	24	29	35	38	40	3	98	79	9.5	9	5	49	20
M022	22	26	31	37	40	42	3	98	79	9.5	9	5	49	20
M025	25	30	34	40	44	46	3	99	79	10	9	5	49.5	20
M028	28	33	37	43	47	49	3	99	79	10	9	5	49.5	20
M030	30	35	39	45	49	51	3	99	79	10	9	5	49.5	20
M032	32	38	42	48	54	58	3	99	79	10	9	5	49.5	20
M035	35	40	44	50	56	60	3	99	79	10	9	5	49.5	20
M040	40	45	51	58	61	65	4	109	83	10	9	6	54.5	23
M043	43	48	54	61	64	68	4	109	83	13	9	6	54.5	23
M045	45	50	56	63	66	70	4	109	83	13	9	6	54.5	23
M048	48	53	59	66	69	73	4	109	83	13	9	6	57	23
M050	50	55	62	70	71	75	4	114	83	15.5	9	6	57	25
M055	55	60	67	75	80	85	4	114	83	15.5	9	6	57	25
M060	60	65	72	80	85	90	4	115	83	16	9	6	57.5	25
M065	65	70	77	85	90	95	4	115	83	16	9	6	57.5	25
M070	70	75	83	92	95	104	4	123	85	19	9	7	61.5	28
M075	75	80	88	97	100	109	4	123	85	19	9	7	61.5	28
M080	80	85	95	105	105	114	4	123	85	19	9	7	61.5	28
M085	85	90	100	110	110	119	4	123	85	19	9	7	61.5	28
M090	90	95	105	115	115	124	4	123	85	19	9	7	61.5	28
M095	95	100	110	120	120	129	4	123	85	19	9	7	61.5	28
M100	100	105	115	125	125	134	4	123	85	19	9	7	61.5	28

L1A TYPEInside unbalanced seal design **DIN** standard**Application Range**

Max. pressure 10kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 150,000cp
 Slurry 7%max

Particular's of type

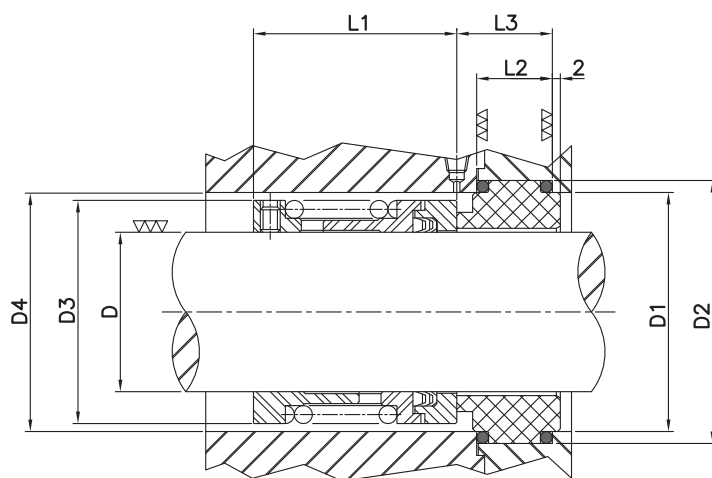
One coil spring type
 Unbalanced seal
 High slurry used

Compatible Seal Liquid

High slurry fluid
 Paper plup, paint
 Waste water, etc

(MM)

SEAL	D	D1	D2	D3	D4	L1	L2
SIZE	h6	H11	H8		MIN.	±0.5	±0.05
M020	20	29	35	34	36	44	9.5
M022	22	31	37	36	38	45	9.5
M025	25	34	40	39	41	47	10
M028	28	37	43	42	44	47	10
M030	30	39	45	44	46	49	10
M032	32	42	48	46	48	49	10
M035	35	44	50	49	51	51	10
M038	38	49	56	54	58	51	13
M040	40	51	58	56	60	53	13
M045	45	56	63	61	65	53	13
M048	48	59	66	64	68	60	13
M050	50	62	70	66	70	60	15.5
M055	55	67	75	71	75	64	15.5
M058	58	70	78	76	83	67	16
M060	60	72	80	78	85	67	16
M065	65	77	85	83	90	72	16
M068	68	81	90	86	93	73	16
M070	70	83	92	90	95	74	19
M075	75	88	97	95	104	75	19
M080	80	95	105	100	109	77	19
M085	85	100	110	105	114	78	19
M090	90	105	115	110	119	79	19
M095	95	110	120	115	124	81	19
M100	100	115	125	120	129	82	19

L1B TYPEInside unbalanced seal design **ISO** standard**Application Range**

Max. pressure 10kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 150,000cp
 Slurry 7%max

Particular's of type

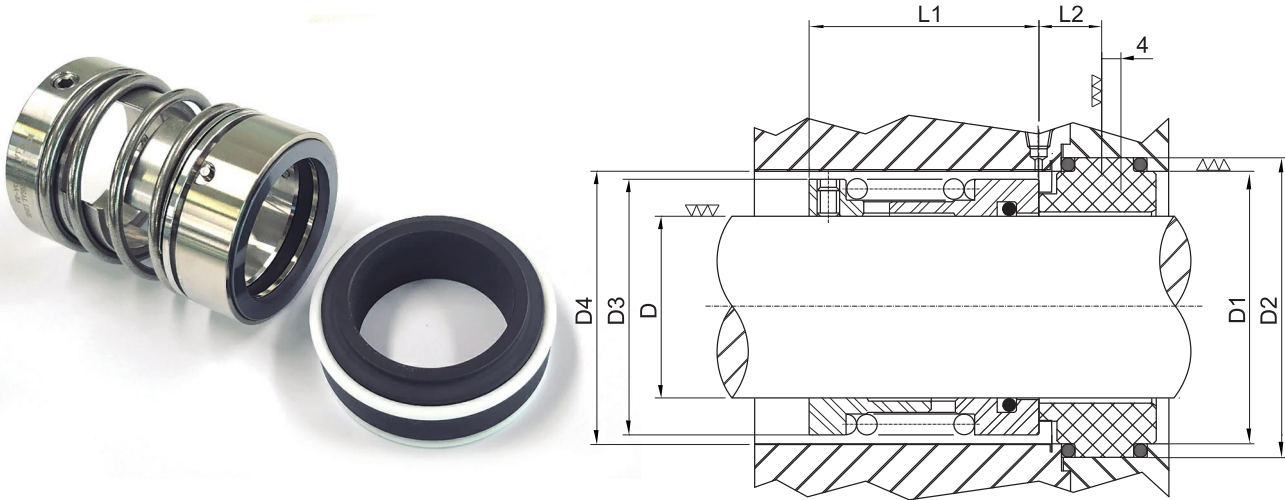
One coil spring type
 Unbalanced seal
 Teflon V-ring used
 High slurry

Compatible Seal Liquid

High slurry fluid
 Paper plug, paint, solvent
 High polymer, etc.

(MM)

SEAL	D	D1	D2	D3	D4	L1	L2	L3
SIZE	h6	H11	H8		MIN.	±0.5	±0.05	
M020	20	36	42	34	36	44	18	23
M022	22	38	44	36	38	45	18	23
M025	25	41	47	39	41	47	18	23
M028	28	44	50	42	44	47	18	23
M030	30	46	52	44	46	49	18	23
M035	35	51	57	49	51	51	18	23
M038	38	58	64	54	58	51	20	25
M040	40	60	66	56	60	53	20	25
M045	45	65	71	61	65	53	20	25
M048	48	68	74	64	68	60	20	25
M050	50	70	76	66	70	60	20	25
M055	55	75	81	71	75	64	20	25
M058	58	83	89	76	83	67	22	28
M060	60	85	92	78	85	67	22	28
M065	65	90	97	83	90	72	22	28
M068	68	93	100	86	93	73	24	30
M070	70	95	102	90	95	74	24	30
M075	75	104	111	95	104	75	24	30
M080	80	109	116	100	109	77	25	31
M085	85	114	121	105	114	78	25	31
M090	90	119	126	110	119	79	25	31
M095	95	124	131	115	124	81	25	31
M100	100	129	137	120	129	82	25	31

L1C TYPEInside unbalanced seal design **ISO** standard**Application Range**

Max. pressure 10kg/cm²
 Max. temperature ~ +200°C
 Max. viscosity 150,000cp
 Slurry 7%max

Particular's of type

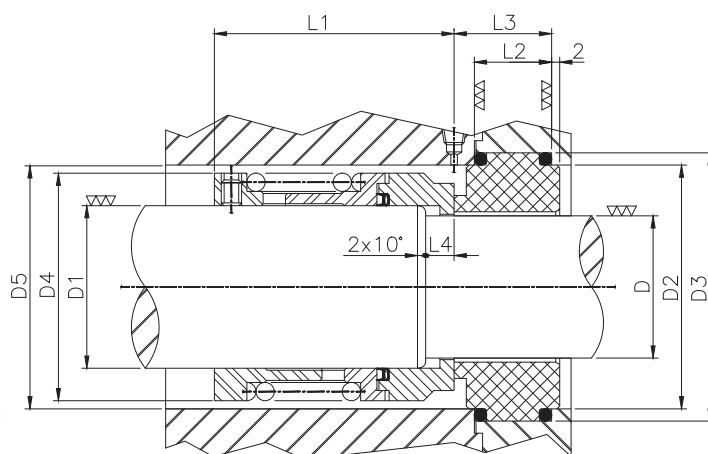
One coil spring type
 Unbalanced seal
 High slurry

Compatible Seal Liquid

High slurry fluid
 Paper plup, paint
 High polymer, etc.

(MM)

SEAL SIZE	D h6	D1 H11	D2 H8	D3	D4 MIN.	L1 ±0,5	L2	L3
M020	20	36	42	34	36	41	18	23
M022	22	38	44	36	38	41	18	23
M025	25	41	47	39	41	43	18	23
M028	28	44	50	42	44	45	18	23
M030	30	46	52	44	46	45	18	23
M032	35	48	54	46	48	45	18	23
M035	35	51	57	49	51	49	18	23
M038	38	58	64	54	58	53	20	25
M040	40	60	66	56	60	55	20	25
M042	42	62	68	58	62	55	20	25
M043	43	63	69	59	63	55	20	25
M045	45	65	71	61	65	55	20	25
M048	48	68	74	64	68	60	20	25
M050	50	70	76	66	70	60	20	25
M052	52	72	78	68	72	61	20	25
M055	55	75	81	71	75	61	20	25
M058	58	83	89	76	83	63	22	28
M060	60	85	91	78	85	63	22	28
M062	62	87	93	80	87	63	22	28
M065	65	90	96	84	90	67	22	28
M068	68	93	99	87	93	67	24	30
M070	70	95	101	90	95	68	24	30
M075	75	104	110	95	104	72	24	30
M080	80	109	115	100	109	72	25	31
M085	85	114	120	107	114	77	25	31
M090	90	119	125	112	119	77	25	31
M095	95	124	130	119	124	82	25	31
M100	100	129	135	124	129	82	25	31

L2B TYPEInside balance seal design **ISO** standard**Application Range**

Max. pressure 30kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 150,000cp
 Slurry 7%max

Particular's of type

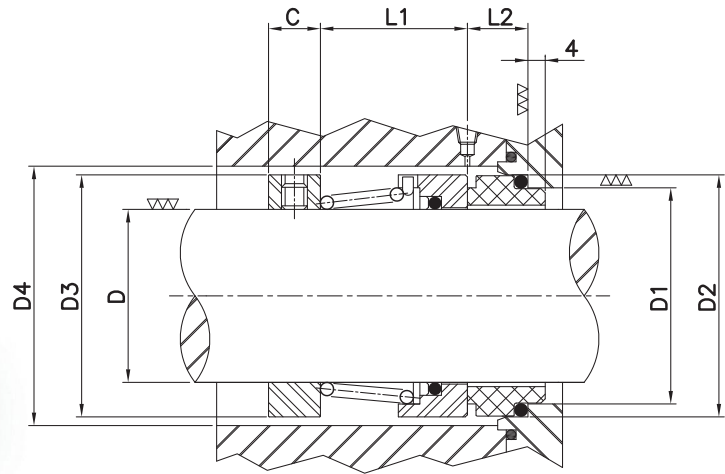
One coil spring type
 Balanced seal
 High pressure
 High slurry

Compatible Seal Liquid

High pressure fluid
 Crystallizing acid, water
 High slurry pump, etc

(MM)

SEAL	D	D1	D2	D3	D4	D5	L1	L2	L3	L4
SIZE	h6	h6	H11	H8		MIN.	±0.5	±0.05		
M025	20	25	41	47	39	47	53	18	23	8
M030	25	30	46	52	44	52	55	18	23	8
M032	28	32	48	54	46	54	55	18	23	8
M035	30	35	51	57	49	57	57	18	23	8
M038	32	38	58	64	54	64	57	20	25	8
M040	35	40	60	66	56	66	59	20	25	8
M045	38	45	65	71	61	71	59	20	25	8
M048	40	48	68	74	63	74	66	20	25	8
M050	45	50	70	76	66	76	67	20	25	8
M052	48	52	72	78	69	78	70	20	25	8
M055	50	55	75	81	71	81	70	20	25	8
M060	55	60	85	91	80	92	75	22	28	8
M065	60	65	90	96	85	97	78	22	28	8
M070	65	70	95	101	90	102	80	24	28	9
M075	70	75	104	110	95	111	81	24	28	9
M080	75	80	109	115	100	116	83	25	31	9
M085	80	85	114	120	107	121	84	25	31	9
M090	85	90	119	125	112	126	85	25	31	9
M095	90	95	124	130	119	131	87	25	31	9
M100	95	100	134	135	124	137	88	27	31	9

L3A TYPEInside unbalanced seal design **ISO** standard**Application Range**

Max. pressure 10kg/cm²
 Max. temperature ~ +200°C
 Max. viscosity 100,000cp
 Slurry 7%max

Particular's of type

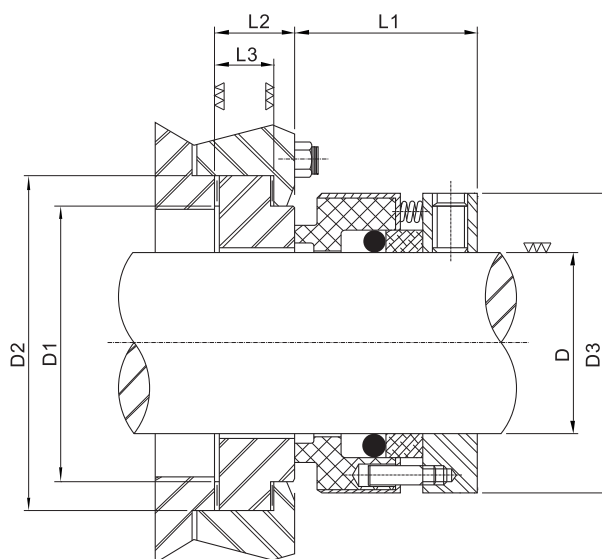
One coil taper type
 Short working length
 Simple structure
 Unbalanced seal

Compatible Seal Liquid

Sanitary fluid
 Cost saving
 Easy cleaning pump, etc

(MM)

SEAL	D	D1	D2	D3	D4	L1	L2
SIZE	h6	H11	H8		MIN.	±0.5	
M020	20	30	36	34	36	24	11
M025	25	35	41	39	41	26	12
M028	28	38	44	42	44	26	12
M030	30	40	46	44	46	26	13
M032	32	42	48	46	48	28	13
M035	35	45	51	54	51	28	13
M040	40	50	56	56	60	34	14
M042	42	52	58	58	62	34	14
M045	45	55	61	61	65	37	14
M048	48	58	64	64	68	37	15
M050	50	60	66	66	70	43	15
M055	55	65	71	71	75	49	15
M060	60	72	78	78	85	55	16
M065	65	77	83	85	90	58	16
M070	70	81	90	90	95	60	18
M075	75	86	95	95	104	60	18
M080	80	91	100	100	109	60	18
M085	85	96	105	105	114	60	18
M090	90	101	110	110	119	60	18
M095	95	106	115	115	124	60	18
M100	100	116	125	120	129	60	20

L4B TYPEOutside balance seal design **ISO** standard**Application Range**

Max. pressure 4kg/cm²
 Max. temperature ~ +200°C
 Max. viscosity 100cp
 Slurry 0.1%max

Particular's of type

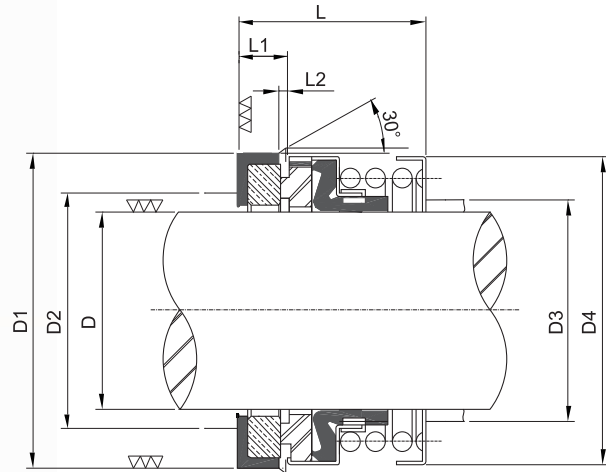
Multi spring type
 Outside seal
 Strongly acid

Compatible Seal Liquid

Strongly corrosive fluid

(MM)

SEAL	D	D1	D2	D3	L1	L2	L3
SIZE	h6	C6	C9		±0,5		±0,05
M025	25	41,5	54,5	51	38	13	17,5
M028	28	45	57,5	54	38	13	17,5
M030	30	46,5	63	56	38	13	17,5
M032	32	48	60,5	58	38	13	17,5
M035	35	51	62,5	61	38	13	17,5
M040	40	60,5	73,5	66	40	13	17,5
M045	45	64	80	71	40	13	17,5
M050	50	70	89,5	76	40	13	17,5
M055	55	73,5	96	81	40	13	17,5
M060	60	78	99,5	86	40	13	17,5
M065	65	83	105	91	40	13	17,5

LWS TYPEInside unbalanced seal design **ISO** standard**Application Range**

Max. pressure 5kg/cm²
 Max. temperature ~ +80°C
 Max. viscosity 300cp
 Slurry 7%max

Particular's of type

One coil spring type
 Short length
 Unbalanced seal

Compatible Seal Liquid

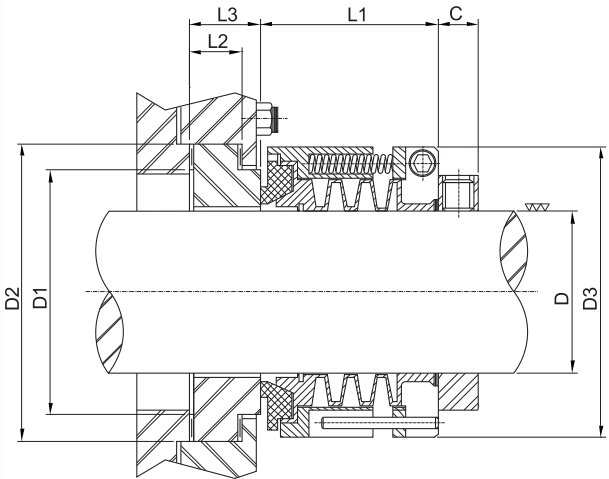
Water seal

(MM)

SIZE D	D1	D2	D3	D4	L	L1	L2
H9	H7		MIN.	MAX.	±0.3		
M08	21	13	12	20.0	18	7	2
M09	24	16	13	21.0	23	7	2
M010	24	16	14	23.5	23	7	2
M011	24	16	15	23.5	23	7	2
M012	26	17	16	26.0	24	7	2
M013	26	17	17	26.0	24	7	2
M014	28	21	18	28.0	25	7	2
M015	28	21	19	28.0	25	8	2
M016	32	22	20	30.0	25	8	2
M017	32	22	21	30.0	26	8	2
M018	35	25	22	32.5	26	8	2
M019	35	25	23	32.5	26	8	2
M020	38	27	24	35.5	28	8	2
M022	40	29	26	37.5	28	8	2
M025	44	32	29	42.0	29	9	2
M028	46	34	32	45.5	30	9	2
M030	50	38	35	48.0	31	9	2
M032	54	40	37	50.0	33	9	2
M035	58	44	40	54.5	36	10	2
M038	60	46	43	58.5	37	10	2
M040	64	48	45	62.5	38	10	2
M045	66	52	50	66.5	40	10	2
M050	72	58	55	72.5	42	10	2

TBS TYPE

Outside teflon bellows seal design **ISO** standard



Application Range

Max. pressure 4kg/cm²
Max. temperature ~ +200°C
Max. viscosity 100cp
Slurry 0.1%max

Particular's of type

Multi spring type
Teflon bellows seal
Outside seal

Compatible Seal Liquid

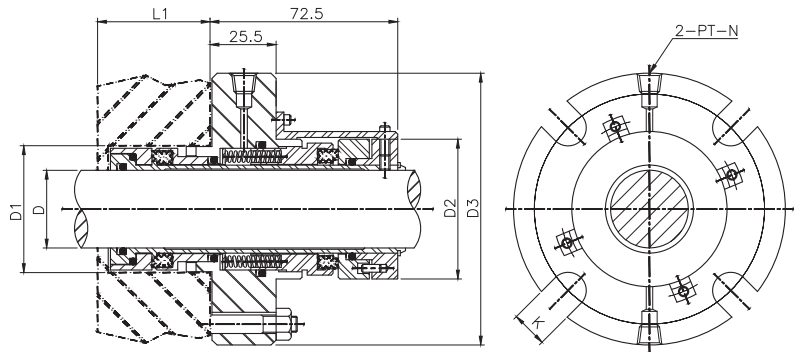
Corrosion resistance fluid
Teflon, FRP, PVDF pump

(MM)

SIZE	D	D1	D2	D3	L1	L2	L3	C
	h6	C6	C9					
025	25	41.5	54.5	57	44	13	17.5	10
028	28	45	57.5	60	44	13	17.5	10
030	30	46.5	63	62	44	13	17.5	10
032	32	48	60.5	64	44	13	17.5	10
035	35	51	62.5	67	44	13	17.5	10
040	40	60.5	73.5	72	44	13	17.5	12
045	45	64	80	77	44	13	17.5	12
050	50	70	89.5	82	44	13	17.5	12
055	55	73.5	96	87	44	13	17.5	12
060	60	78	99.5	92	44	13	17.5	12
065	65	83	105	97	44	13	17.5	12

KSD TYPE

Double cartridge balanced design standard

**Application Range**

Max. pressure 15kg/cm²
 Max. temperature ~ +200°C
 Max. viscosity 300,000cp
 Slurry 10%max

Particular's of type

Ease of installation
 Multi spring type
 Extreme corrosion resistance
 Cartridge mounted

Compatible Seal Liquid

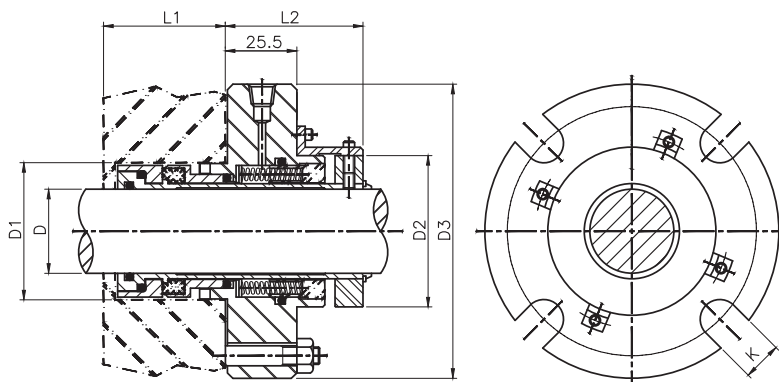
Chemical processing
 High slurry fluid, etc

(MM)

SEAL SIZE	D	D1	D2	D3	L1	K	N	B,C,D	
								MIN.	MAX.
M020	20	39	38.5	44	105	14	1/4"	69	86
M025	25	44	38.5	49	105	14	1/4"	74	86
M030	30	49	38.5	54	105	14	1/4"	79	86
M035	35	54	38.5	59	115	14	1/4"	84	86
M040	40	59	38.5	64	130	14	1/4"	89	111
M045	45	64	39.5	69	140	14	1/4"	94	121
M050	50	69	39.5	74	140	14	1/4"	99	121
M055	55	74	39.5	79	155	17	1/4"	110	131
M060	60	79	39.5	84	155	17	1/4"	115	131
M065	65	84	39.5	89	165	17	1/4"	120	141
M070	70	95	43.5	100	200	17	1/4"	131	176
M075	75	100	43.5	105	205	17	1/4"	136	181
M080	80	105	43.5	110	210	17	1/4"	141	186
M085	85	110	43.5	115	215	17	1/4"	146	190
M090	90	115	43.5	120	220	21	1/4"	158	190
M095	95	120	43.5	125	225	21	1/4"	163	195
M100	100	125	43.5	130	230	21	1/4"	168	200
M110	110	135	43.5	140	240	25	1/4"	185	204
M120	120	145	43.5	150	250	25	1/4"	195	214
M130	130	155	43.5	160	260	25	1/4"	205	224
M140	140	165	43.5	170	270	25	1/4"	215	234
M150	150	175	43.5	180	280	25	1/4"	225	244

KSM TYPE

Single cartridge balanced seal design standard

**Application Range**

Max. pressure 15kg/cm²
 Max. temperature ~ +200°C
 Max. viscosity 300,000cp
 Slurry 10%max

Particular's of type

Ease of installation
 Multi spring type
 Single balanced seal
 Cartridge mounted

Compatible Seal Liquid

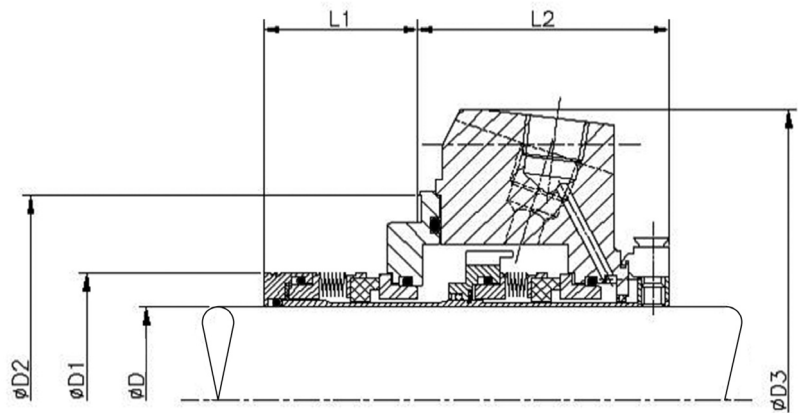
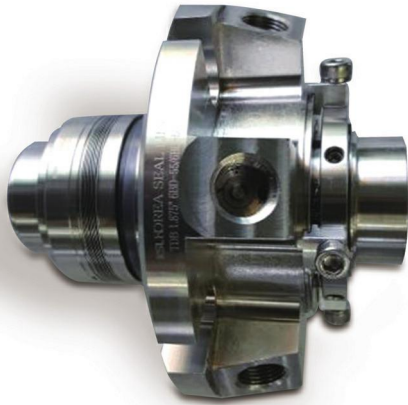
Chemical processing
 High slurry fluid, etc

(MM)

SEAL SIZE	D	D1	D2	D3	L1	K	B.C.D	
							MIN.	MAX.
M020	20	39	38.5	44	105	14	69	86
M025	25	44	38.5	49	105	14	74	86
M030	30	49	38.5	54	105	14	79	86
M035	35	54	38.5	59	115	14	84	86
M040	40	59	38.5	64	130	14	89	111
M045	45	64	39.5	69	140	14	94	121
M050	50	69	39.5	74	140	14	99	121
M055	55	74	39.5	79	155	17	110	131
M060	60	79	39.5	84	155	17	115	131
M065	65	84	39.5	89	165	17	120	141
M070	70	95	43.5	100	200	17	131	176
M075	75	100	43.5	105	205	17	136	181
M080	80	105	43.5	110	210	17	141	186
M085	85	110	43.5	115	215	17	146	190
M090	90	115	43.5	120	220	21	158	190
M095	95	120	43.5	125	225	21	163	195
M100	100	125	43.5	130	230	21	168	200
M110	110	135	43.5	140	240	25	185	204
M120	120	145	43.5	150	250	25	195	214
M130	130	155	43.5	160	260	25	205	224
M140	140	165	43.5	170	270	25	215	234
M150	150	175	43.5	180	280	25	225	244

TDB TYPE

Double cartridge metal bellows seal design standard

**Application Range**

Max. pressure 14kg/cm²
 Max. temperature ~ +250°C
 Max. viscosity 1000cp
 Slurry 0.3%max

Particular's of type

Ease of installation.
 Double metal bellows type
 Circulating shroud, Tandem seal
 Cartridge mounted.

Compatible Seal Liquid

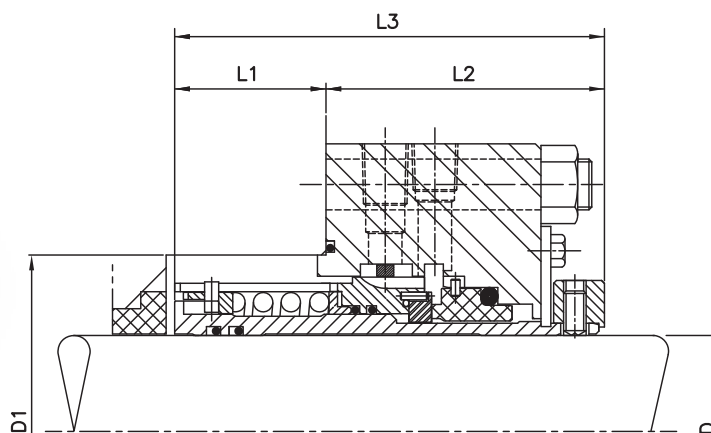
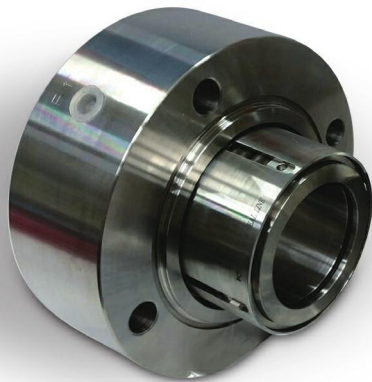
Tandem seals are frequently use for volatile, toxic, carcinogenic, hazardous or poor lubricating fluid.

(INCH)

Seal Size	D	D1	D2	D3	L1	L2
+0.00						
+0.05						
1.375"	1.375"	1.937"	3.375"	5.250"	1.84"	2.06"
1.875"	1.875"	2.564"	4.125"	5.88"	1.571"	2.454"
2.625"	2.625"	3.437"	5.125"	7.000"	2.097"	3.238"

KSQ TYPE

Single cartridge balanced seal design standard

**Application Range**

Max. pressure 70kgf/cm²
 Max. temperature ~ +220℃
 Max. viscosity 1000cp
 Slurry 3%max

Particular's of type

Ease of installation.
 One coil spring type
 Circulating shroud
 Cartridge mounted.

Compatible Seal Liquid

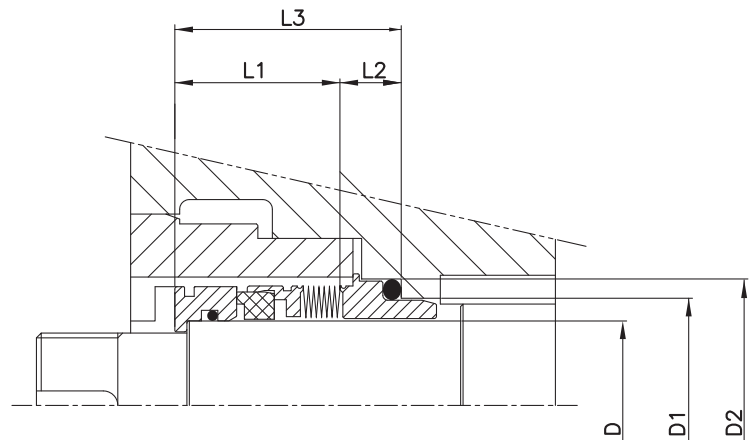
Boiler feed pump
 Hot-molten fluid.
 High pressure

(INCH)

Seal Size	Inches				
	D	D1	L1	L2	L3
1.250	0.875	2.063	2.000	2.750	4.750
1.437	1.065	2.438	1.938	2.750	4.688
1.500	1.128	2.375	2.063	3.000	5.063
1.750	1.315	2.938	2.281	3.063	5.344
1.875	1.440	2.813	2.406	3.094	5.500
2.062	1.565	3.125	2.625	3.750	6.375
2.250	1.815	3.250	2.375	3.688	6.063
2.375	1.878	3.500	3.156	3.656	6.812
2.500	2.003	3.750	3.094	3.969	7.063
2.875	2.378	4.063	2.813	4.031	6.844
3.000	2.503	4.438	2.813	4.313	7.126
3.250	2.753	4.563	2.813	4.313	7.126
3.375	2.878	4.938	2.938	4.500	7.438
3.500	3.003	4.938	2.844	4.438	7.282
3.625	3.128	4.938	3.000	4.375	7.375
3.750	3.253	5.188	3.031	4.438	7.469
4.000	3.503	5.250	3.063	4.500	7.563
4.250	3.753	5.625	3.188	4.406	7.594
4.312	3.753	5.750	3.438	4.469	7.907
4.500	4.003	6.063	3.063	4.563	7.626
4.875	4.315	6.313	3.594	4.281	7.875
5.125	4.565	6.625	3.688	4.625	8.313
5.500	4.940	7.125	3.813	4.813	8.626
6.000	5.503	7.750	3.875	4.719	8.594

MBV TYPE

Metal bellows seal design Standard

**Application Range**

Max. pressure 7kg/cm²
 Max. temperature ~ +260°C
 Max. viscosity 1000cp
 Slurry 0.3%max

Particular's of type

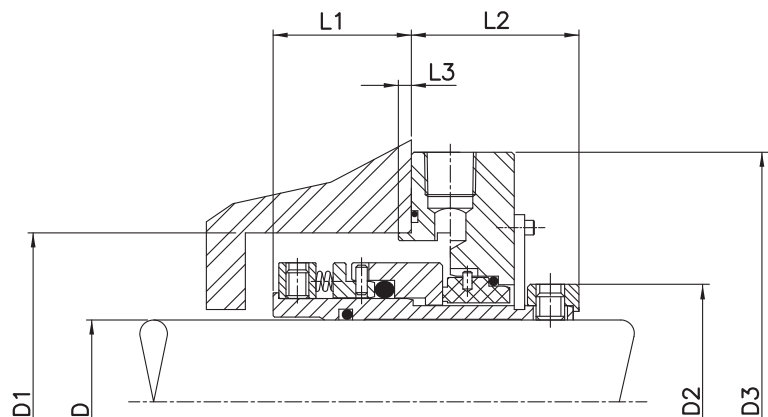
Metal bellows type.
 High vacuum pump
 Seal series : ø35, ø45, ø55, ø90
 Newsco pump

Compatible Seal Liquid

Screw vacuum pump

KSB TYPE

Single cartridge balanced seal design Standard

**Application Range**

Max. pressure 40kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 1000cp
 Slurry 3%max

Particular's of type

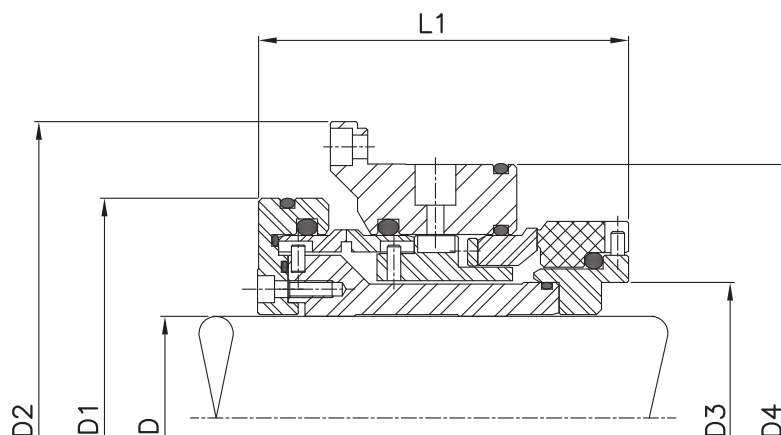
Ease of installation.
 Multi spring type
 Balanced seal, High pressure
 Cartridge mounted.

Compatible Seal Liquid

High pressure pump
 Hot-molten fluid.
 Non crystallizing acid, salt
 Hydrocarbon, etc.

DMS TYPE

Double Cartridge balanced seal design Standard

**Application Range**

Max. pressure 17kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 3000cp
 Slurry 7%max

Particular's of type

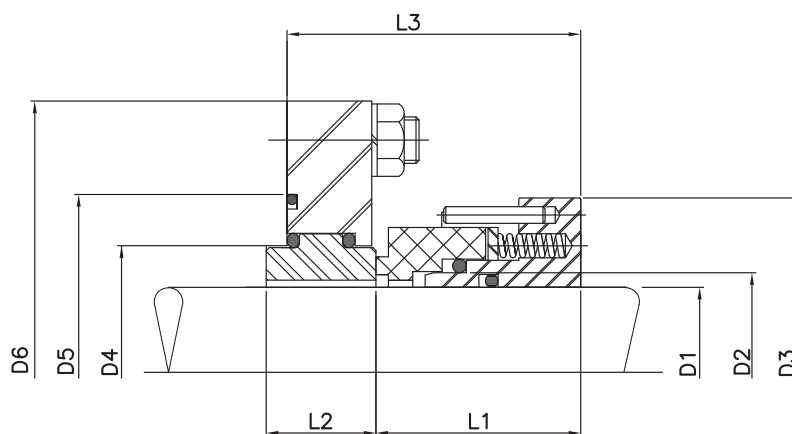
Ease of installation.
 Multi spring type
 Balanced seal, High viscosity
 Cartridge mounted.

Compatible Seal Liquid

Homo mixer pump
 Paper pulp
 Crystallizing acid, salt
 Hydrocarbon, etc.

L5B TYPE

Outside balanced seal design Standard

**Application Range**

Max. pressure 3kg/cm²
 Max. temperature ~ +120°C
 Max. viscosity 350 rpm
 Slurry 0.3%max

Particular's of type

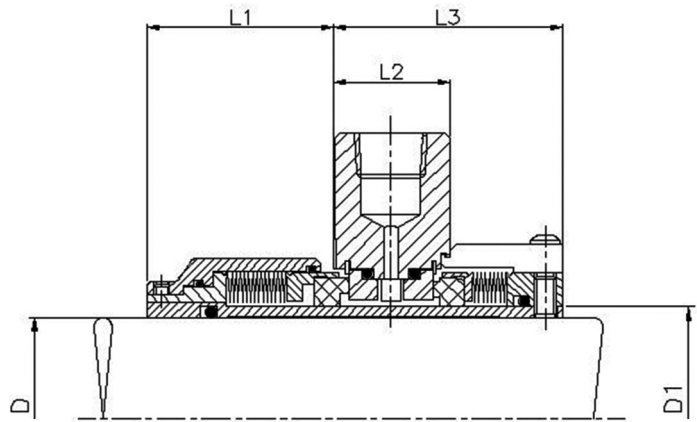
Multi spring type
 Balanced seal
 Dry running seal
 Out side seal

Compatible Seal Liquid

Full vacuum vessel
 Mixer, Agitator
 Heavy duty design

ABS TYPE

Double cartridge metal bellows seal design Standard



Application Range

Max. pressure 20kg/cm²
 Max. temperature ~ +220°C
 Max. viscosity 15000cp
 Slurry 7%max

Particular's of type

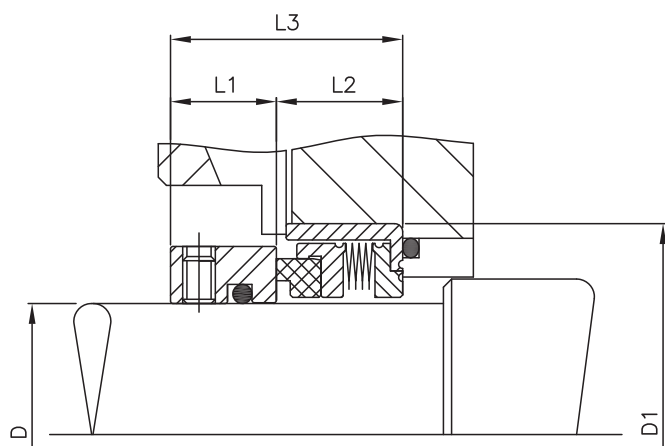
Metal bellows type
 Easy of installation
 Bellows protect cover
 Patent 10-0970466

Compatible Seal Liquid

High slurry pump
 High viscosity
 Crystallizing liquid, etc

MCS TYPE

Metal bellows seal design Standard



Application Range

Max. pressure 7kg/cm²
 Max. temperature ~ +260°C
 Max. viscosity 1000rpm
 Slurry 0.3%max

Particular's of type

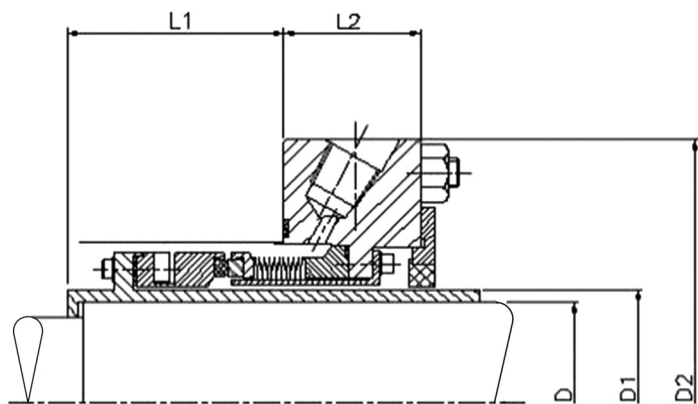
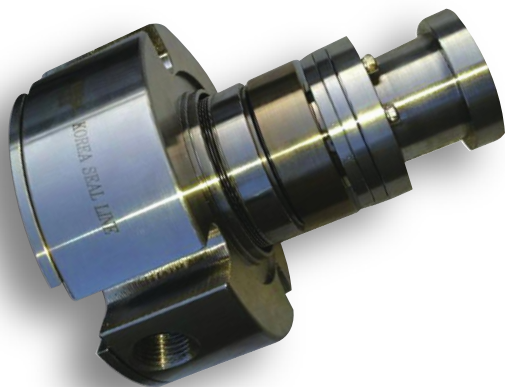
Metal bellows type.
 Booster pump
 Static seal
 Patent 10-1370773

Compatible Seal Liquid

Vacuum pump
 Turbine, compressor
 Centrifugal, etc.
 High speed

FBS TYPE

Single cartridge metal bellows seal design Standard



Application Range

Max. pressure 20kg/cm²
Max. temperature ~ +400°C
Max. viscosity 1000cp
Slurry 2%max

Particular's of type

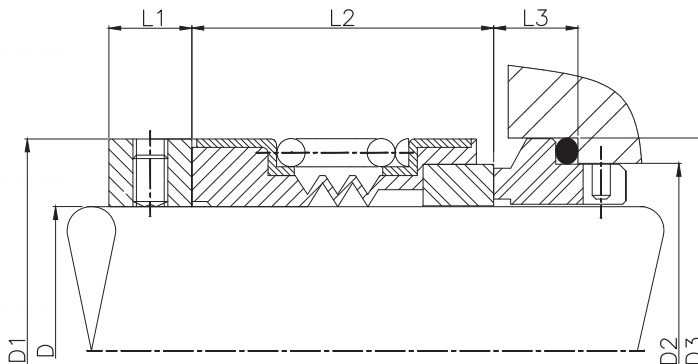
Metal bellows type
Graphite sheet used as packing
High temperature,static seal
Cartridge mounted

Compatible Seal Liquid

Hot water
Hot-molten fluid,
Crystallizing acid, salt
Hydrocarbon, etc.

SLWS TYPE

Rubber bellows seal design DIN Standard



Application Range

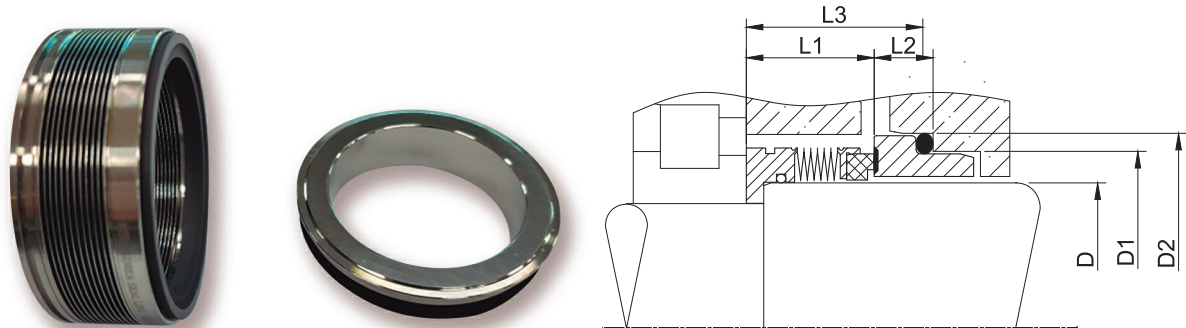
Max. pressure 10kg/cm²
Max. temperature ~ +90°C
Max. viscosity 1000rpm
Slurry 3%max

Particular's of type

Rubber bellows type
One coil spring
Inside Rubber Relex
Shin Shin pump

Compatible Seal Liquid

Sea water pump
Oil pump
Centrifugal pump,etc
Marine pump

MBD TYPE**Application Range**

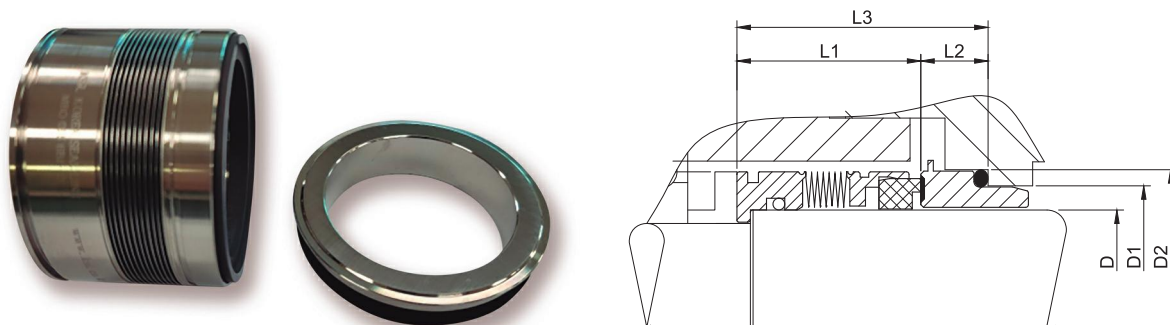
Max. pressure 4kg/cm²
 Max. temperature ~ +280°C
 Max. viscosity 1000cp
 Slurry 0.3%max

Particular's of type

Metal bellows type
 High speed
 Dong Bang pump
 Seal series(ø 35, ø 50, ø 55, ø 60, ø 63, ø 90)

Compatible Seal Liquid

Screw Vacuum Pump

MBO TYPE**Application Range**

Max. pressure 4kg/cm²
 Max. temperature ~ +280°C
 Max. viscosity 1000cp
 Slurry 0.3%max

Particular's of type

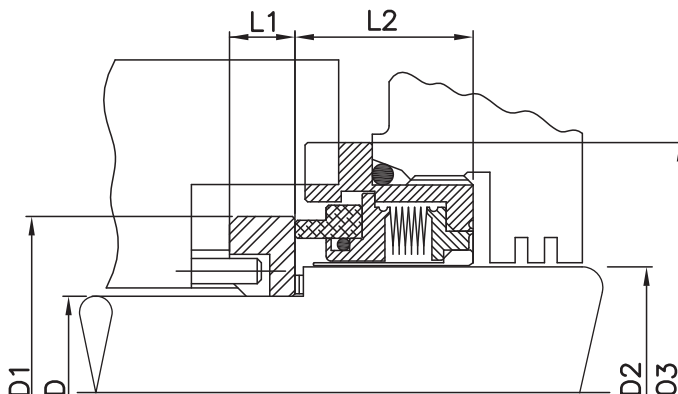
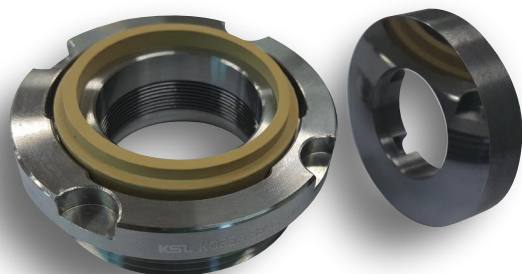
Metal bellows type
 High speed
 Kowel precision pump
 Seal series(ø 35, ø 45, ø 55, ø 90)

Compatible Seal Liquid

Screw Vacuum pump

GCS TYPE

Metal bellows seal design Standard

**Application Range**

Max. pressure 15kg/cm²
 Max. temperature -170°C ~ -200°C
 Max. viscosity 1000cp
 Slurry 0.3%max

Particular's of type

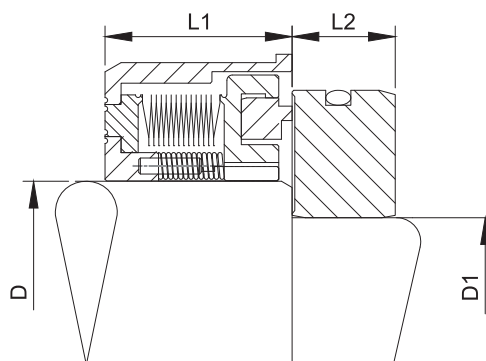
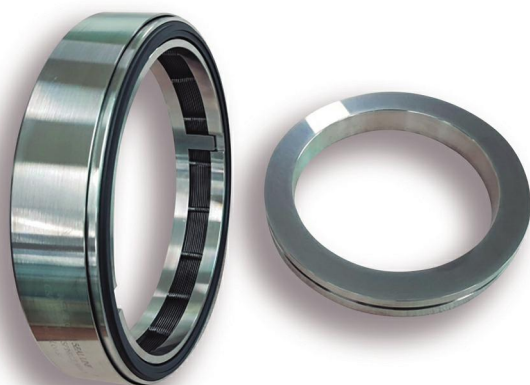
Metal bellows type
 Extreme low temperature
 Flange Screw
 Cryo pump

Compatible Seal Liquid

Extreme low temperature
 Oxygen gas Liquid
 Nitrogen gas Liquid
 Argon gas Liquid

GBS TYPE

Spindle Seal

**Application Range**

Max. pressure 30kg/cm²
 Max. temperature 260°C
 Max. viscosity 1000cp
 Slurry 0.3%max

Particular's of type

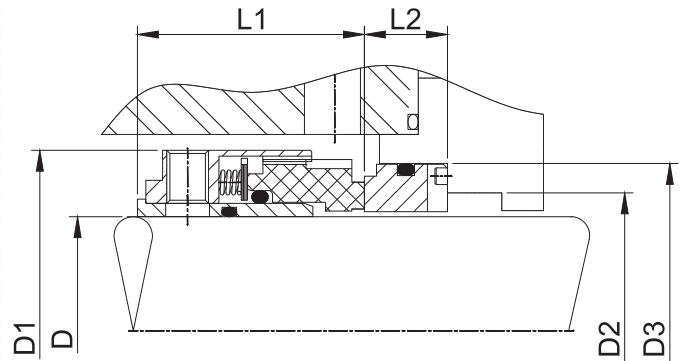
In side : Multi spring
 Out side : Metal bellows

Compatible Seal Liquid

Gear Box Seal
 Spindle Seal

K6A TYPE

Inside Balanced Seal with Sleeve

**Application Range**

Max. pressure 50kg/cm²
 Max. temperature ~ 280°C
 Max. viscosity 1000cp
 Slurry 0.3%max

Particular's of type

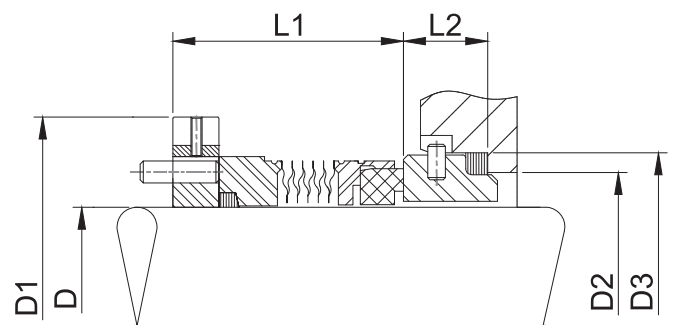
No shaft step
 Balanced seal
 W/Sleeve

Compatible Seal Liquid

High Pressure
 No step pump

HPS TYPE

Pumping Metal Bellows design DIN Standard

**Application Range**

Max. pressure 20kg/cm²
 Max. temperature 400°C
 Max. viscosity 1000cp
 Slurry 0.3%max

Particular's of type

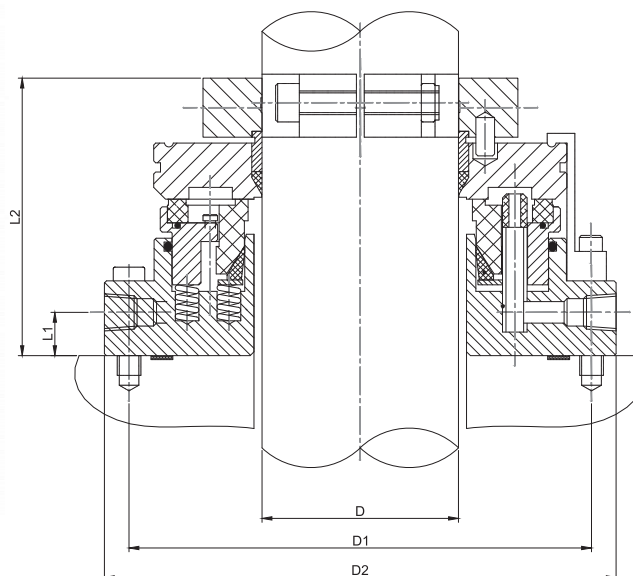
Metal bellows type.
 Pumping Screw
 API 23 PLAN

Compatible Seal Liquid

High Temperature
 Oil & refinery pump
 Hot molten fluid

KBDO TYPE

Unit Seal



Application Range

Max. pressure 20kg/cm²
 Max. temperature ~200°C
 Max. viscosity 1000cp
 Slurry 0.5%max

Particular's of type

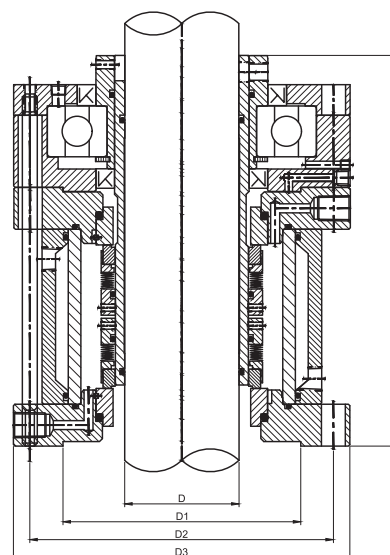
Seal Face : Inside, Outside
 Double Face
 High Vibration
 High Temperature

Compatible Seal Liquid

High Pressure
 High Slurry
 Unit seal

KSL-400 TYPE

Unit Seal



Application Range

Max. pressure 10kg/cm²
 Max. temperature 260°C

Particular's of type

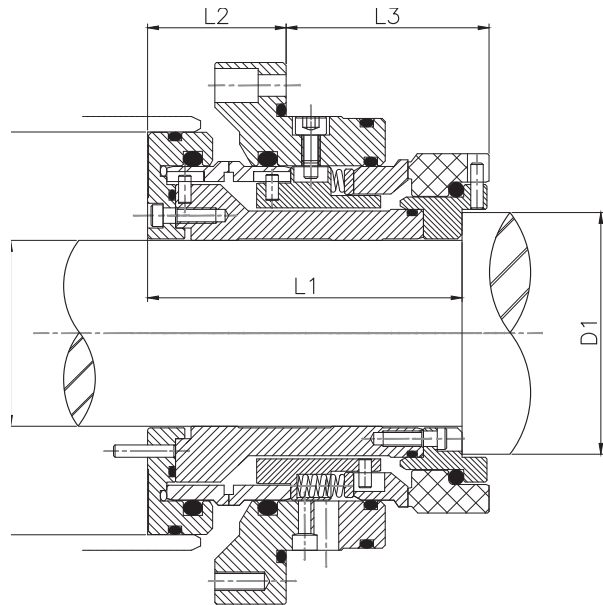
Metal bellows type
 In, Out Bellows type

Compatible Seal Liquid

Unit seal

KSL-600 TYPE

Unit Seal

**Application Range**

Max. pressure 20kg/cm²
 Max. temperature ~ 200°C
 Max. viscosity 1000cp
 Slurry 0.5%max

Particular's of type

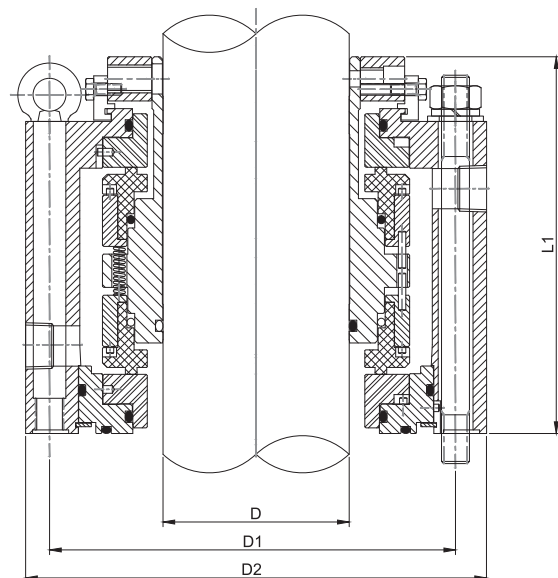
Seal Face : Inside, Outside
 Double Face
 Mill seal

Compatible Seal Liquid

High Pressure
 High Slurry
 Unit seal

KSL-800 TYPE

Unit Seal

**Application Range**

Max. pressure 30kg/cm²

Particular's of type

Non Bearing type

Compatible Seal Liquid

Unit seal

KSL-200 TYPE

Unit Seal



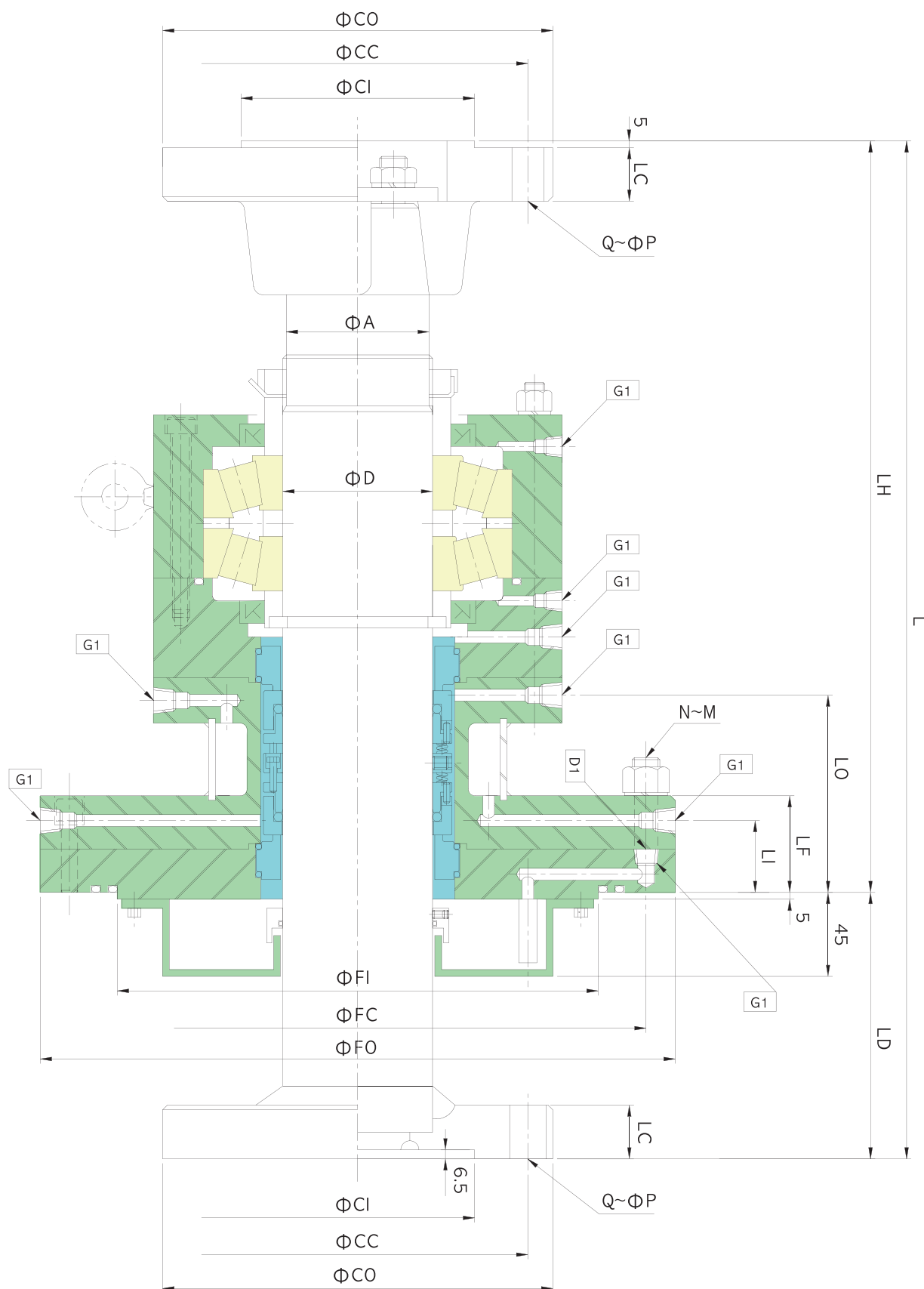
KSL-300 TYPE

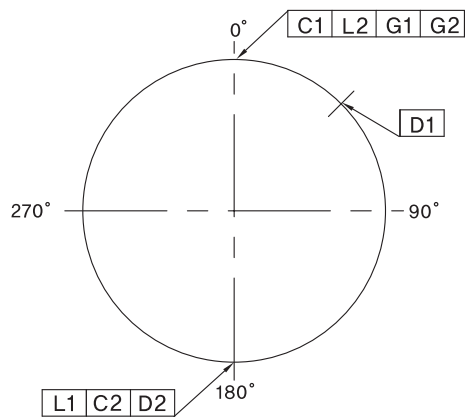
Unit Seal



Agitator Mixer Seal

구 분 \ Type		KSL100	KSL200	KSL300
적용 범위	일반특징	Seal Unit에서 Shaft Thrust 및 Radial Force를 잡아주며, Shaft Coupling이 함께조립되어 있다.	가장 일반적인 Type으로서 Shaft의 Radial Force만을 잡아준다.	Glass Lining용 및 특수재질을 요하는 내산용 Seal Unit.
	적용온도	250 ° C	250 ° C	250 ° C
	적용압력	Full Vac.~30kg/cm ² (MAX. 60kg/cm ²)	Full Vac.~30kg/cm ² (MAX. 60kg/cm ²)	Full Vac.~15kg/cm ² (MAX. 30kg/cm ²)
사용 Seal Type	Indoard	K1B	K1B	K1B
	Outboard	K1B	K1B	L4B
Bearing Type		Taper Roller	자동조심형	Taper Roller
Shaft and Coupling		Yes	No	No
Sleeve		No Yes(Optional)	Yes	Yes
Shaft 동력 전달 방법		Lock Nut	Clutch System with Set Collar and Set Screw	Clutch System with Set Collar and Set Screw
Drain Box		Yes	Yes	No
Cooling Jacket		Yes	Yes	Yes
보조 System 및 보조 장치		Lubricating System Cooling System Lubricator (Optional)	Lubricating System Cooling System Lubricator (Optional)	Lubricating System Cooling System Lubricator (Optional)
기타				

KSL-100 TYPE**Agitator Seal**



NO.	SERVICE	CONNECTION	REMARK
L1	SEALANT OIL INLET	PT3/8"	
L2	SEALANT OIL OUTLET	PT3/8"	
C1	COOLING WATER INLET	PT3/8"	
C2	COOLING WATER OUTLET	PT3/8"	
D1	DRAIN HOLE	PT3/8"	
D2	DRAIN HOLE	PT3/8"	
G1	GREASE OUTLET	PT1/4"	
G2	GREASE INLET	PT1/4"	

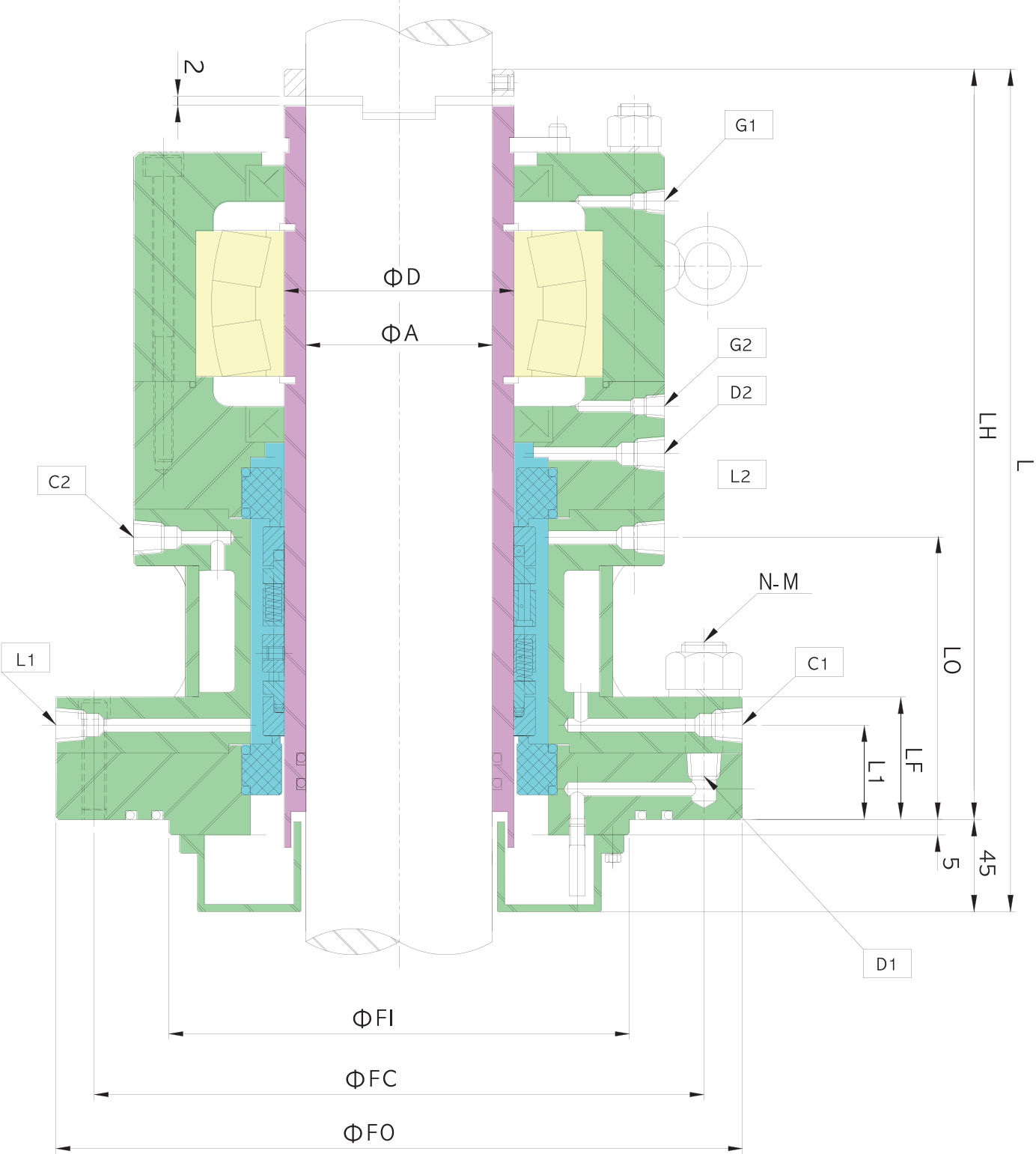
"KSL - 100" DIMENSION

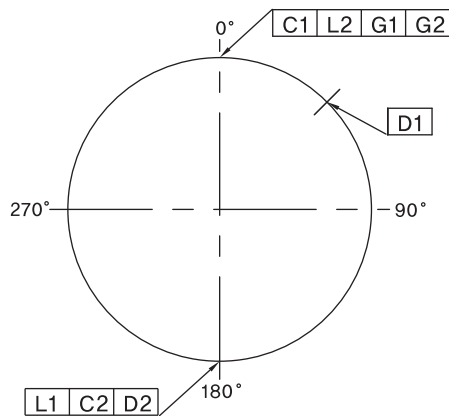
(MM)

	A	D	F1	FC	FC	L	LH	LO	LF	LI	LD	N	M	O	P	CI	CC	CO	LC	BEARING NO.
020	25	30	125	170	200	467	329	109	54	43	138	8	16	6	14	70	95	120	16	#7306
030	35	40	145	195	235	504	354	119	54	43	150	8	20	6	18	80	110	140	18	08
040	45	50	160	215	255	523	371	119	54	43	152	8	20	6	18	95	125	155	20	10
050	55	60	180	235	275	552	392	124	56	44	160	8	20	6	18	115	145	175	22	12
060	65	70	210	260	300	581	414	127	58	45	167	12	20	6	22	130	165	205	25	14
070	75	80	225	280	320	600	431	127	58	45	169	12	20	6	22	145	180	220	27	16
080	85	90	160	315	355	618	446	127	58	45	172	12	20	6	26	170	210	255	30	18
090	95	100	275	335	380	623	449	128	60	46	174	12	24	8	26	185	225	270	32	#30220
100	105	110	290	350	395	640	463	128	60	46	177	12	24	8	26	200	240	285	35	22
110	115	120	315	375	420	655	473	128	60	46	182	12	24	8	26	225	265	310	40	24
120	125	130	335	395	440	665	481	128	60	46	184	12	24	10	26	245	285	330	42	26
130	135	140	355	415	460	690	503	128	60	46	187	12	24	10	26	265	305	350	45	28
140	145	150	365	425	470	703	514	128	62	46	189	12	24	10	26	275	315	360	47	30
150	155	160	375	435	480	746	546	138	62	48	200	16	24	10	26	285	325	370	50	32
160	165	170	385	445	490	774	572	138	62	48	202	16	24	10	26	295	335	380	52	34
180	185	190	405	465	510	802	594	138	62	48	208	16	24	12	26	315	355	400	57	38
200	215	220	435	530	575	896	673	149	65	51	223	20	24	12	26	335	385	430	65	44

KSL-200 TYPE

Agitator Seal





NO.	SERVICE	CONNECTION	REMARK
L1	SEALANT OIL INLET	PT3/8"	
L2	SEALANT OIL OUTLET	PT3/8"	
C1	COOLING WATER INLET	PT3/8"	
C2	COOLING WATER OUTLET	PT3/8"	
D1	DRAIN HOLE	PT3/8"	
D2	DRAIN HOLE	PT3/8"	
G1	GREASE OUTLET	PT1/4"	
G2	GREASE INLET	PT1/4"	

"KSL - 200" DIMENSION

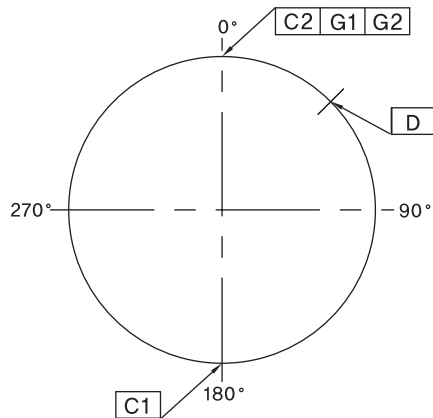
(MM)

	A	D	F1	FC	FO	L	LH	LO	LF	LI	N	M	BEARING NO.
030	30	50	140	195	235	323	278	119	54	43	8	20	#22210
040	40	60	160	215	255	336	291	124	56	44	8	20	12
050	50	70	175	230	270	349	304	127	58	45	12	20	14
060	60	80	190	245	285	351	306	127	58	45	12	20	16
070	70	90	210	265	305	358	313	127	58	45	12	20	18
080	80	100	235	300	345	368	323	128	60	46	12	24	20
090	90	110	255	320	365	377	332	128	60	46	12	24	22
100	100	120	270	335	380	384	339	128	60	46	12	24	24
110	110	130	285	350	395	390	345	128	60	46	12	24	26
120	120	140	305	370	415	397	352	128	60	46	12	24	28
130	130	150	325	390	435	402	357	128	60	46	12	24	30
140	140	160	345	410	455	419	374	138	62	48	16	24	32
150	150	170	365	430	475	427	382	138	62	48	16	24	34
160	160	180	375	440	485	427	382	138	62	48	16	24	36
180	180	200	415	480	525	450	405	138	65	51	16	24	40
200	200	220	450	520	565	473	429	138	66	52	16	24	44

KSL-300 TYPE Agitator Seal

KSL-300 TYPE

Agitator Seal



NO.	SERVICE	CONNECTION	REMARK
L1	SEALANT OIL INLET	PT3/8"	
L2	SEALANT OIL OUTLET	PT3/8"	
D	DRAIN HOLE	PT3/8"	
G1	GREASE INLET	PT1/4"	
G2	GREASE OUTLET	PT1/4"	

"KSL - 300" DIMENSION

(MM)

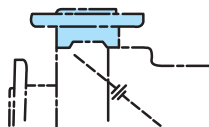
SIZE	ΦA	ΦD	ΦFI	ΦFC	ΦFO	L	LO	LH	LF	LI	N-M	BEARING SIZE
50	30	50	Φ185	Φ205	Φ230	196	20	57	105	47	6-14	#7214
60	40	60	Φ195	Φ215	Φ240	205	20	61	105	48	6-14	#7216
80	55	80	Φ240	Φ270	Φ305	227	22	73	105	53	8-18	#30220
90	65	90	Φ275	Φ313	Φ350	237	22	76	105	56	12-22	#30222
100	75	100	Φ300	Φ340	Φ380	251.5	22	76.5	115	56	12-22	#30224
110	85	110	Φ330	Φ370	Φ410	252	22	79	115	62	12-22	#30226
120	95	120	Φ350	Φ400	Φ440	262	22	81	115	62	12-22	#30228
140	110	140	Φ350	Φ400	Φ440	277	25	85	115	62	12-22	#30232
150	125	150	Φ410	Φ460	Φ500	302	26	89	115	62	12-24	#30234
160	135	160	Φ420	Φ470	Φ510	302	26	91	115	62	12-24	#30236
180	145	180	Φ460	Φ510	Φ560	318	26	93	115	62	12-24	#30240
200	165	200	Φ500	Φ550	Φ600	336	26	97	115	62	12-24	#30244

Check for Mechanical Seal Face

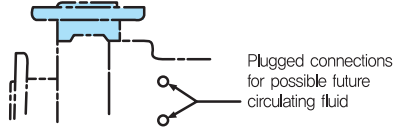
One Light Band .0000116" (0.29 micron)	Two Light Bands .000023" (0.58 micron)	Three Light Bands .000035" (0.58 micron)	Nine Light Bands .0001 (2.7 micron)

API STANDARD 610

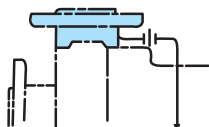
Piping for Primary Seals

**Plan 1**

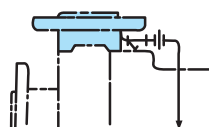
Integral (internal) recirculation from pump discharge to seal

**Plan 2**

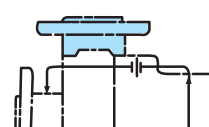
Deed-ended seal box with no circulation of flush fluid. Water-cooled box jacket, and throat bushing required unless otherwise specified.

**Plan 11**

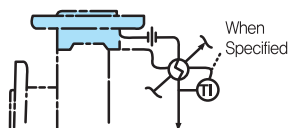
Recirculation from pump case through orifice to seal.

**Plan 12**

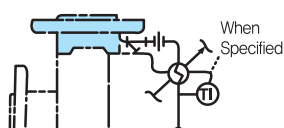
Recirculation from pump case through strainer and orifice to seal.

**Plan 13**

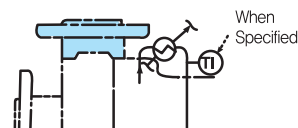
Recirculation from seal chamber through orifice and back to pump suction.

**Plan 21**

Recirculation from pump case through orifice and cooler to seal.

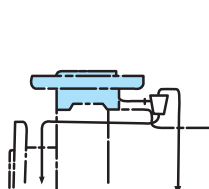
**Plan 22**

Recirculation from pump case through strainer, orifice, and cooler to seal.

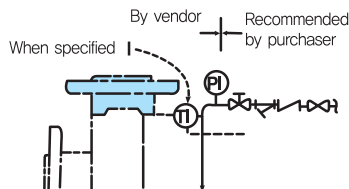
**Plan 23**

Recirculation from seal with pumping ring through cooler and back to seal.

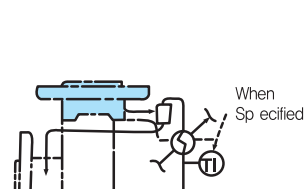
Dirty or special Pumpage

**Plan 31**

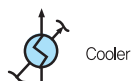
Recirculation from pump case through cyclone separator delivering clean fluid to seal and fluid with solids back to pump suction.

**Plan 32**

Injection to seal from external source of clean fluid (see note 2).

**Plan 41**

Recirculation from pump case through cyclone separator delivering clean fluid through cooler to seal and fluid with solids back to pump suction.



Cooler



Pressure gage with block valve



Dial thermometer



Pressure switch with block valve



Cyclone separator



Flow indicator



Y-type strainer



Flow-regulating valve



Block valve



Check valve



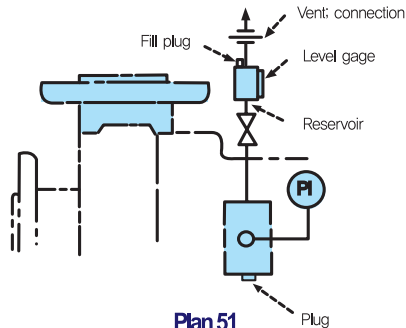
Orifice

Note :

- These plans represent commonly used systems. Other variations and systems are available and should be specified in detail by the purchaser or mutually agreed upon by the purchaser and the vendor.
- For Plan 32, the purchaser shall specify the fluid characteristics, and the vendor shall specify the volume (gallons per minute) and pressure (pounds per square inch gage) required.

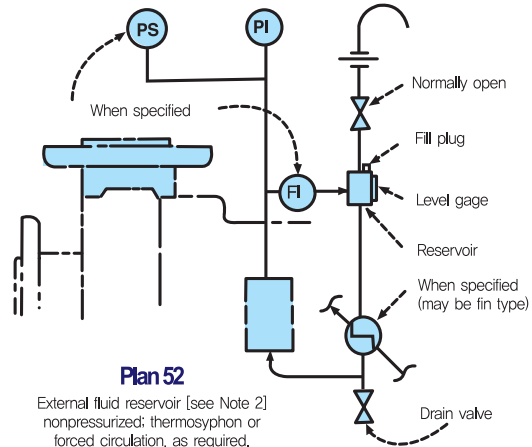
CENTRIFUGAL PUMPS FOR GENERAL REFINRY SERVICES

Piping for Throttle Bushing, Auxiliary Seal Device, or Double Seal, Tandem Seals



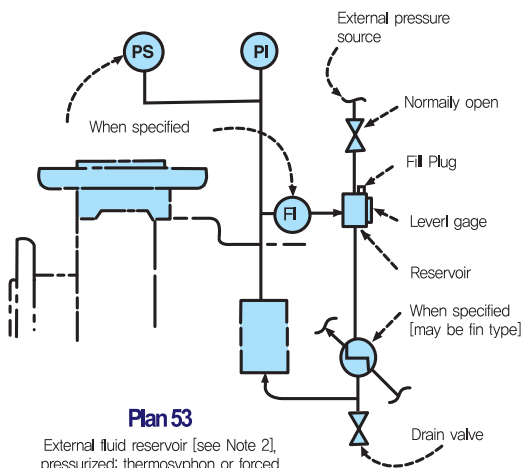
Plan 51

Deed-ended blank (usually methanol; see Note 2).



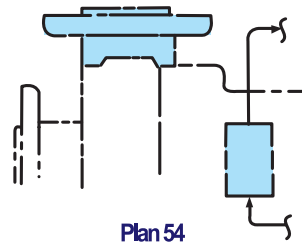
Plan 52

External fluid reservoir [see Note 2] nonpressurized; thermosyphon or forced circulation, as required.



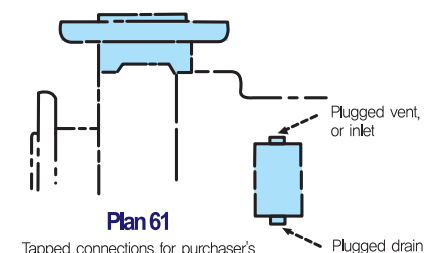
Plan 53

External fluid reservoir [see Note 2], pressurized; thermosyphon or forced circulation, as required.



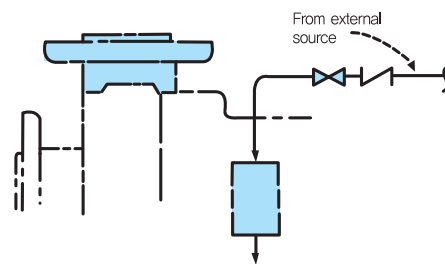
Plan 54

Circulation of clean fluid from an external system [see Note 2].



Plan 61

Tapped connections for purchaser's use; Note 2 shall apply when purchaser is to supply fluid (steam, gas, water, etc.) to auxiliary sealing device.

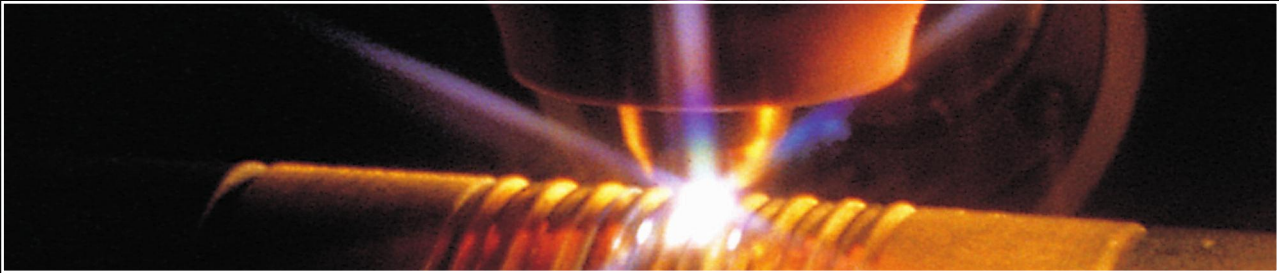


Plan 52

External fluid quench [steam, gas, water, etc., see Note 2].

Notes:

1. These plans represent commonly used systems. Other variations and systems are available and should be specified in detail by the purchaser or mutually agreed upon by the purchaser and the vendor.
2. The purchaser shall specify the fluid characteristics when supplemental seal fluid is provided, the vendor shall specify the volume (gallons per minute) and pressure (pounds per square inch gage) required, where these are factors.
3. See Figure D-2 for explanation of symbols not specified here.





MBS



HBS



DBS

Mechanical Seal 재질 선정 분석표

A = Good as ant component B = Good for glands, collars and compression units
X = Not recommended

LIQUID NAME		APPLI CATION		PACKING					FACES					BODY				
		(% DENSITY)	(°C TEMPERATURE)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Acetaldehyde	CH ₃ CHO		<100	x	x	x	A	x	A	A	A	A	A	A	A	A	A	A
Acetic Acid	CH ₃ COOH	<40	<100	x	x	x	A	A	A	X	A	A	A	X	A	A	A	X
Acetic Anhydride	(CH ₃ CO) ₂ O		<100	x	x	x	A	A	A	X	A	A	A	X	A	B	A	B
Acetone	CH ₃ COOH		<100	x	x	A	A	A	A	A	A	A	A	A	A	A	A	A
Acetylene	C ₂ H ₂		<100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Acrolein	CH ₂ =CHCOOH	10	<100	x	x	x	A	A	A	A	A	A	A	A	B	A	A	B
Acetonitrile	CH ₃ CN		<80	x	x	x	A	A	A	A	A	A	A	A	B	A	A	B
Acrylic Acid	CH ₂ =CHCOOH		<66	x	x	x	A	A	A	A	A	A	A	A	A	A	A	B
Acrolein	CH ₂ =CHCOOH	10	<100	x	x	x	A	A	A	A	A	A	A	A	B	A	A	B
Adipic Acid	(CH ₂) ₄ (COOH) ₂		25	x	x	x	A	A	A	A	A	A	A	A	A	A	A	A
Allyl Alcohol	CH ₂ =CHCH ₂ OH	all	<100	x	x	x	A	A	A	A	A	A	A	A	A	A	A	A
Allyl Chlorid	CH ₂ CHCH ₂ CL	90	<100	x	x	x	A	A	A	A	A	A	A	A	B	B	B	X
Allyl Acetate	CH ₃ COOCH ₂ CHCH ₂			x	x	x	A	A	A	A	A	A	A	A	A	A	A	A
AluminiumChloride	ALCL ₃		<100	A	A	A	A	A	A	X	A	A	A	X	X	X	A	X
Aluminium Hydroxide	A1(OH) ₂	10	<100	x	A	x	A	A	A	A	A	A	X	A	B	B	B	B
Aluminium Sulfate	AL ₂ (SO ₄) ₂	<50	<100	A	A	x	A	A	A	X	A	A	X	X	B	B	B	X
Arithracen Oil			<300	x	x	x	A	A	A	A	A	A	A	A	A	A	A	A
Apiezon				A	x	A	A	A	A	A	A	A	A	A	A	A	A	A
Aqua Regia	HNO ₃ +HCL		<66	X	x	x	A	A	x	X	A	A	X	X	X	X	X	X
Arsenic Acid	H ₃ A ₃ O ₄		<100	A	A	A	A	A	A	X	A	A	X	X	B	B	B	B
Arachis Oil				A	x	A	A	A	A	A	A	A	A	A	A	A	A	A
Asphalt				x	x	A	A	A	A	A	A	A	A	A	A	A	A	A

A = Good as ant component

B = Good for glands, collars and compression units

X = Not recommended

LIQUID NAME		APPLI CATION		PACKING					FACES					BODY				
		DENS ITY (%)	TEMPERATURE (° C)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Barium Chloride	BACL ₄ 2H ₂ O	<60	<100	A	A	A	A	A	A	X	A	A	X	X	B	B	A	B
Barium Hydroxide	Ba(OH) ₂	<50	<100	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B
Barium Nitrate	Ba(NO ₃) ₂	<30	<100	A	A	A	A	A	A	X	A	A	X	X	B	B	B	B
Barium Sulfide	BaSO ₄	<10	<100	A	A	A	A	A	A	X	A	X	X	X	B	B	B	B
Barium Sulfide		<10	<100	A	A	A	A	A	A	X	A	X	X	X	B	B	B	B
Barium Sulfide	BaSO ₂	<10	<100	A	A	A	A	A	A	X	A	X	X	X	B	B	B	B
Beer				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Benzene	C ₄ H6		<100	X	X	A	A	A	A	A	A	A	A	A	B	A	A	B
Benine				B	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Benzenesulfonic Acid	C6H5SO ₃ H	all	<21	X	X	A	A	A	A	X	A	X	A	X	B	A	B	B
Benzoicacid	C7H6O ₃		<100	X	X	A	A	A	A	X	A	A	X	A	A	A	A	A
Blast Furance Gas				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Boiler Feed Water	H ₂ O			A	A	A	A	A	A	A	A	A	A	A	B	A	A	A
Bonc Acid	H ₃ BO ₃	<50	<100	A	A	A	A	A	A	X	A	A	A	X	B	B	A	B
Bromic Acid	HBrO ₃	<50	25	X	X	x	A	A	A	X	A	A	X	X	X	B	A	X
Bromine	Br ₂		25	X	X	A	A	A	A	X	A	A	X	X	X	B	A	X
Bunder Fuen				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Butadiener	H ₂ C=CHCN=CH ₂		<100	X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Butyl Acetate	CH ₃ (COOC)H9			X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
N-Butyl Acrylate	C7H12O ₂		<100	A	X	A	A	A	A	X	A	A	A	X	A	A	A	A
N-Butanol	CH ₃ (CH ₂) ₃ OH		<100	X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Butyl Aldehyde	C ₂ H7CHO		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A

A = Good as ant component

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X = Not recommended

LIQUID NAME		APPLI CATION		PACKING					FACES					BODY				
		DENS ITY (%)	TEMPERATURE (°C)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Butyl Phenol	C ₄ H ₉ C ₆ H ₄ OH			X	X	X	A	A	A	X	A	A	X	X	X	B	B	X
Butyric Acid	C ₄ H ₈ O ₂		<100	X	X	X	A	A	A	X	A	A	X	X	X	A	A	B
Carvon Disulfide	CS ₂	90	<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Calcium Bisulfite	Ca(HSO ₃) ₂		<100	X	A	X	A	A	A	X	A	A	A	X	A	A	A	X
Calcium Carbonate	CaCO ₃			A	A	A	A	A	A	A	A	A	A	A	A	B	B	A
Calcium Chloride	CaCl ₂	<30	<100	A	A	A	A	A	A	A	A	A	A	A	X	B	A	X
Calcium Nitrate	Ca(NO ₃) ₂ ·4H ₂ O	<40	<100	A	A	A	A	A	A	X	A	A	A	X	B	B	B	B
Calcium Phosphate Dibasic	CaHPO ₄ ·~2H ₂ O			A	A	A	A	A	A	X	A	A	A	X	B	B	B	B
Calcium Sulfite	CaSO ₃ ·2H ₂ O	10	<100	A	A	A	A	A	A	X	A	A	A	X	A	A	A	A
Cane Sugar Liquors		<20		A	A	A	A	A	A	A	A	A	A	A	A	A	A	X
Caprolactam	CH ₂ CH ₂ CH ₂ CH ₂ CH ₂ CONH		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Carbonic Acid Aqueous		<10	<100	X	A	A	A	A	A	X	A	A	A	X	A	A	A	A
Carbon Monoxide	CO		<100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Carbon Tetrachloride	CCl ₄	<100	<100	X	X	A	A	A	A	A	A	A	A	A	B	A	A	X
Castor Oil				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Caustic Soda	NaOH	>30	<100	X	A	X	A	A	A	X	A	A	A	X	A	A	A	X
Chlorine	Cl ₂		<50	X	X	X	A	A	A	X	A	A	X	A	B	A	A	B
Chloropicrin	CCINO ₂	<100	<100	X	X	X	A	A	A	X	A	A	A	X	B	B	A	B
Chlorosulphonic	Acid SO ₂ Cl(OH)		25	X	X	X	A	A	X	X	A	A	A	X	X	B	A	X
Chromic Acid	H ₂ CrO ₄	<20	<60	X	X	X	A	A	X	X	A	A	X	X	X	X	A	X
Citric Acid	(OH)C ₃ H ₄ (COOH) ₃ ·H ₂ O	<50	<100	A	A	A	A	A	A	X	A	A	A	A	A	B	A	B
Clay Slurry				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

A = Good as ant component

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X = Not recommended

LIQUID NAME	APPLI CATION		PACKING					FACES					BODY				
	(DENS ITY (%)	(TEMPERATURE (°C)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Cider		25	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Coal Tar	<50	<100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	X
Coconut Acid			X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Condensate Water		<100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Cooling Tower Water			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Cooper Acetate Cu(CH3COO)2·H2O	<20	<100	X	A	X	A	A	A	X	A	A	A	X	A	A	B	B
Cooper Cyandide CuSO4·5H2O	10	<100	A	A	A	A	A	A	X	A	A	A	X	A	A	B	A
Cooper Sulfite CuSO4·5H2O	<70	<100	A	A	A	A	A	A	X	A	A	A	X	B	B	A	B
Com Oil			A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Cotton Seed Oil			A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Creosote		<100	A	X	A	A	A	A	X	A	A	X	X	B	B	B	B
Cupric Chloride CuCl2	<40	25	X	X	A	A	A	A	X	A	A	A	X	X	X	A	X
Cumene C6H5CH(CH3)		<100	X	X	A	A	A	A	X	A	A	X	X	B	B	B	B
Cyclohexane C6H12		<100	A	X	A	A	A	A	X	A	A	A	X	B	B	B	B
Cyclohexane C6H11OH		<100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Cyclohexanol CH2(CH2)4CO		<100	X	X	X	A	A	A	A	A	A	X	A	B	B	B	B
Diamyl Phthalate C6H5(COOCH11)2		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Diamyl Phthalate C6H4(COOC4H9)2		<200	X	A	X	A	A	A	A	A	A	A	A	A	A	A	A
Dichloropentane C5H10Cl2		<21	X	X	A	A	A	A	A	A	A	A	A	A	A	B	A
Diethy Benzene C6H4(C2H6)2			X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Diethyl Carbonate (C2H5)2CO2		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Dimethyl Amine (CH3)2NH	all	<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A

A = Good as ant component
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 X = Not recommended

LIQUID NAME	APPLI CATION		PACKING					FACES					BODY				
	DENS ITY (%)	TEMPERATURE (°C)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Dimenthyl Ether (CH ₃) ₂ O		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Dimethyl Formamide (C ₃ H ₇ NO)			X	A	X	A	A	A	A	A	A	A	A	A	A	A	A
Dimethyl Terephthalate C ₁₀ H ₈ O ₄			X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Di-n-Butyl Ether C ₄ H ₉ OC ₄ H ₉		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Dinitro Chlorobenzen C ₆ N ₃ (NO ₂) ₂ O ₄		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Dioctyl Phthalate C ₈ H ₁₇ (COOC ₈ H ₁₇) ₂		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Diphenyl C ₆ H ₅ C ₆ H ₅		<100	X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Didecyl Benzene C ₁₂ H ₂₅ C ₆ H ₅		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Diphenylmethane (C ₆ H ₅) ₂ CH ₂		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Epichlorohydrine C ₃ H ₅ OCl		<100	X	X	X	A	A	A	A	A	A	A	A	B	A	A	X
Ethane C ₂ H ₆		<100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Ethyl Acetate CH ₃ COOC ₂ H ₅		<80	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Ethylbenzene C ₆ H ₅ C ₂ H ₅		<100	X	X	A	A	A	A	A	A	A	A	A	B	A	A	B
Ethyl Bromide C ₂ H ₅ Br		25	X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Ethyl Formate HCOOC ₂ H ₅		<100	X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Ethyl Cellulose C ₈ H ₁₇ O ₂ (OH) ₂ OC ₂ H ₅		<100	X	X	X	A	A	A	x	A	A	X	X	B	B	B	B
Ethyl Chloride C ₂ H ₅ Cl			A	X	A	A	A	A	A	A	A	A	A	A	A	B	A
Ethylene CH ₂ =CH ₂		<100	A	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Ethylene Chlorohydrine CLCH ₂ CH ₂ OH	90	<100	A	X	A	A	A	A	A	A	A	A	A	A	A	B	A
Ethylene dichloride CLCH ₂ CH ₂ Cl		25	X	X	X	A	A	A	X	A	A	X	X	B	B	X	X
3-Thylpyridine C ₇ H ₉ N			X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Ethylene Glycol CH ₂ OHCH ₂ OH		<100	X	A	X	A	A	A	A	A	A	A	A	A	A	A	A

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LIQUID NAME		APPLI CATION		PACKING					FACES					BODY				
		DENS ITY (%)	TEMPERATURE (°C)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Ethylene Oxde	(CH ₂) ₂ O		25	X	X	X	A	A	A	A	A	A	A	A	B	B	A	B
Fatty Acids			<150	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Ferric Chloride	Fed ₃		25	A	A	A	A	A	X	X	A	A	A	X	X	X	B	X
Febric Hydroxide	Fe(OH) ₂	10	<100	X	A	A	A	A	A	X	A	A	X	X	B	B	B	B
Febric Nitrate	Fe(NO ₃) ₃ ·9H ₂ O	<50	<100	A	A	A	A	A	A	X	A	A	A	X	B	A	B	B
Ferric Chloride	FeCl ₂	10	<100	X	A	A	A	A	A	X	A	A	X	X	X	X	B	X
Fish Oil			<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Flon Gas			0	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Formaldehyde	HCHO	<40	<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Formic Acid	HCOOH	<90	<100	X	X	X	A	A	A	X	A	A	A	A	X	A	A	X
Fuel Oil				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Fufural	C ₄ H ₂ OCHO	<30		X	X	X	A	A	A	X	A	A	A	X	A	A	B	A
Fuset Oil			<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Gasoline			<100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Gelatine				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Glucose	C ₃ H ₁₂ O ₆			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Glue				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Glycerine	C ₃ H ₅ (OH) ₂	10	<50	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Grease				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Green Liquor				X	A	A	A	A	A	A	A	A	A	A	B	B	A	X
Helium	He			A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Heptance(Liquid)	CH ₂ (CH ₂) ₅ CH ₃		<100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	X

A = Good as ant component

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LIQUID NAME		APPLI CATION		PACKING					FACES					BODY				
		DENS ITY (%)	TEMPERATURE (° C)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Hexane	CH ₃ (CH ₂) ₄ CH ₃		<100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Hydrogen Cyanide	HCN	<10	<100	X	X	X	A	A	A	X	A	A	A	X	X	B	B	X
Hydrazine	N ₂ H ₄	<50	25	X	A	X	A	A	A	X	A	A	A	X	X	X	X	X
Hydrobromic Acid	HBr	<40	<100	X	A	A	A	A	A	X	A	A	X	X	X	X	X	X
Hydrochloric Acid	HCl	<40	25	X	A	A	A	A	A	X	A	A	X	X	X	X	A	X
Hydrochloric Acid	HF	all	25	X	X	A	A	A	X	X	A	A	X	X	X	B	B	X
Hydrogen Peroxide	H ₂ O ₂		25	X	X	A	A	A	X	X	A	A	X	X	B	B	B	B
Hydrogen Sulfide	H ₂ S	<50	25	X	A	X	A	A	A	X	A	A	A	X	B	A	A	X
Hypochlorous Acid	HOCl	<20		X	A	X	A	A	X	X	A	A	X	X	X	X	A	X
Ink				X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Iodine	I ₂ +H ₂ O		<100	X	X	A	A	A	X	X	A	A	X	X	B	B	B	B
Iodoform	CHI ₂		<100	X	A	X	A	A	A	X	A	A	A	X	A	A	B	X
Isobutane	C ₄ H ₁₀			A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Isobutyl Alcohol	(CH ₃) ₂ CHCH ₂ OH			A	X	A	A	A	A	X	A	A	X	X	B	B	B	B
Isopentane	CH ₃ CHCH ₃ CH ₂ CH ₃		<100	A	X	A	A	A	A	X	A	A	X	X	B	B	B	B
Isopropyl Acetate	CH ₃ CO ₂ CH(CH ₃) ₂		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Isopropyl Alcohol	(CH ₃) ₂ CHOH			X	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Isopropyl Amine	(CH ₃) ₂ CHNH ₂			X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Kaoline	Al ₂ O ₃ 2SiO ₂ 2H ₂ O			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Kerosene				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Latex		<50		A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
Lavender Oil			<100	X	X	A	A	A	A	A	A	A	A	A	A	A	A	A

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LIQUID NAME		APPLI CATION		PACKING					FACES					BODY				
		DENS ITY (%)	TEMPERATURE (°C)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Lead Acetate	Pb(CH ₃ COO) ₂ ·3H ₂ O		<100	X	A	X	A	A	A	X	A	A	X	X	B	B	B	B
Lead Nitrate	Pb(NO ₃) ₂		<100	A	A	X	A	A	A	X	A	A	X	X	B	B	B	B
Lime Water			<100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Liquefied Natural Gas				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Liquefied Petroleum Gas			<100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Liqid Nitrogen	LN ₂			X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Lithium Bromide	LiBr			A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Lithium Chloride	LiCl	<60	<100	X	A	X	A	A	A	A	A	A	A	A	B	A	A	X
Lubricating Oil				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Lye			<50	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Magnesium Chloride	MgCl ₃	<10	<100	A	A	A	A	A	A	A	A	A	A	A	X	X	A	X
Magnesium Hydroxide	Mg(OH) ₂	<10	<100	X	A	A	A	A	A	A	A	A	X	A	B	B	B	B
Magnesium Nitrate	Mg(NO ₃) ₂ ·7H ₂ O	all	<100	A	A	A	A	A	A	A	A	A	X	A	B	B	B	B
Magnesium Sulfate	MgSO ₄ ·6H ₂ O	140	<100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	X
Maleic Acid	COOH(CH) ₂ COOH	<50	<100	X	X	A	A	A	A	X	A	A	X	X	B	B	B	B
Maleic Anhydride	(CHCO) ₂ O			X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Malic Acid	COOHCH ₂ CH(OH)COOH	<50	<100	A	X	A	A	A	A	X	A	A	X	X	A	B	B	A
Nabgabese Cguibde	MnCl ₂	<40	<100	X	X	X	A	A	A	X	A	A	X	X	B	A	A	X
Manganese Sulfate	MnSO ₄	<10	<100	A	A	A	A	A	A	X	A	A	X	X	A	A	A	X
Mercaptan	C ₂ H ₆ SH		25	X	A	X	A	A	A	X	A	A	X	X	A	A	A	A
Mercuric Chloride	HgCL	<10	25	A	A	A	A	A	A	X	A	A	X	X	X	X	B	X
Mercury	Hg		<370	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

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		DENS ITY (%)	TEMPERATURE (°C)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Methane(Gas)	CH ₄		<100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Methanol	CH ₃ OH	all	<100	A	A	X	A	A	A	A	A	A	A	A	A	A	A	B
Methyl Acetate	CH ₃ COOCH ₃	<30	<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Methyl Acrylate	CH ₃ CHCOOCH ₃		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Methyl Chloride	CH ₃ Cl		<100	X	X	A	A	A	A	X	A	A	A	X	A	B	A	X
Methyl Isopropyl Ketone	CH ₃ COOH(CH ₃) ₂		25	X	X	X	A	A	A	X	A	A	X	X	B	B	B	B
Methyl Methacrylate	CH ₂ =C(CH ₃)CO ₂ CH ₂		<100	X	X	X	A	A	A	X	A	A	A	X	A	A	A	X
Methyl Cyclopentane	C ₆ H ₁₂		25	X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Methyl Formate	HCOOCH ₂	<30	<100	X	X	X	A	A	X	A	A	X	X	A	A	A	A	A
Milk				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Mineral Oil			<100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Mineral Spirits				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Mine Water			<100	X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Monobasic Sodium Phosphate	NaH ₂ PO ₄ ·H ₂ O	all	<100	A	X	A	A	A	A	X	A	A	A	X	X	A	A	B
Monoethanolamine	HOCH ₂ CH ₂ NH ₂	all	<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Naphtha				X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Naphthalene	C ₁₀ H ₈			X	X	A	A	A	A	X	A	A	A	X	A	A	A	A
Naphthenic Acid				X	X	A	A	A	A	X	A	A	A	X	A	A	B	X
Nickel Chloride	NiCl ₂	<40	<100	A	A	A	A	A	A	X	A	A	A	X	B	B	A	X
Nicket Sulfate	NiSO ₄	<60	<100	A	A	A	A	A	A	X	A	A	A	A	B	B	B	A
Nitric Acid	HNO ₃	all	<100	X	X	X	A	A	X	X	A	A	A	X	A	B	X	B
Nitrocellulose Lacquar				X	X	X	A	A	A	A	A	A	A	A	A	A	A	A

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		DENS ITY (%)	TEMPERATURE (°C)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Nitromethane	CH ₃ NO ₃		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Nitrobenzene	C ₆ H ₅ NO ₂		<100	X	A	X	A	A	A	A	A	A	A	A	A	A	B	A
Nitrous Acid	HNO ₂		25	X	X	X	A	A	A	X	A	A	X	X	B	B	X	X
Nonane	C ₈ H ₁₇ orCH ₃ (CH ₂) ₇ CH ₃		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Nonyl Phenol	C ₈ H ₁₉ OH		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Octanol	C ₈ H ₁₈		<100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Oleic Acid	C ₁₈ H ₃₄ O ₂	<90	25	X	X	X	A	A	A	X	A	A	A	X	B	A	A	X
Olive oil				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Oxalic Acid	(CO ₂ H) ₂	<90	25	X	A	A	A	A	A	X	A	A	A	X	X	A	B	X
Palmitic Acid	C ₁₅ H ₃₁ COOH		<200	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Palm Oil			<100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Paraffin, Wax				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Penctin				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Penicillin	C ₁₆ H ₁₈ O ₄ N ₂ S	<100	<50	X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
n-Pentane(Gas)	CH ₃ (CH ₂) ₄ CH ₃	90	<100	A	X	A	A	A	A	A	A	A	A	A	B	B	A	B
Perchloroethylene	CCl ₂		35	X	X	A	A	A	A	A	A	A	A	A	B	B	A	B
Phenol	C ₆ H ₅ OH		<100	X	X	A	A	A	A	X	A	A	A	X	B	B	A	B
Phenyl acetic Acid	C ₈ H ₈ D ₂	<80		X	A	X	A	A	A	A	A	A	A	A	B	A	A	B
Phosgene	COCL ₂		<100	X	X	X	A	A	A	A	A	A	A	A	X	X	A	X
Phoshorc Acid	H ₃ PO ₄	10	50	X	A	A	A	A	X	A	A	A	A	A	A	A	A	A
Phosphorus Oxychloride	POCL ₃		25	X	X	X	A	A	X	A	A	A	X	X	X	X	B	X
Phosphorus Trichloride	PCL ₃		25	X	A	A	A	A	X	A	A	A	A	A	A	A	A	A

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		DENS ITY (%)	TEMPERATURE (°C)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Phthalic Acid	C ₆ H ₄ (CO ₂ H) ₂	all		X	X	X	A	A	A	X	A	A	X	X	A		B	B
Phthalic Anhydride	C ₈ H ₄ O ₃		< 260	X	X	X	A	A	A	A	A	A	A	A	A		A	A
Picric Acid	C ₆ H ₃ O ₇ N ₃		25	X	X	A	A	A	A	X	A	A	X	X	B		B	B
Piperazine	C ₄ H ₁₀ N ₂		< 100	X	X	X	A	A	A	A	A	A	A	A	A		A	A
Pitch				X	X	X	A	A	A	A	A	A	A	A	A		A	A
Potassium Alum	K ₂ SO ₄ · AL ₂ (SO ₄) ₃ · 2H ₂ O	< 10	< 100	A	X	A	A	A	A	A	A	A	A	A	A		A	A
Polyethylene	(C ₂ H ₄) _n		< 100	X	X	X	A	A	A	A	A	A	A	A	A		A	A
Polyethylene Glycol	—HO(CH ₂ CH ₂ O) _m H		< 100	X	A	A	A	A	A	A	A	A	A	A	A		A	A
Polyethylene		< 70		X	X	A	A	A	A	A	A	A	A	A	A		A	A
Polystyrene	(C ₆ H ₅ CH=CH ₂) _n		25	X	X	X	A	A	A	A	A	A	X	A	B		B	B
Potassium Carbonate	K ₂ CO ₃	< 30	< 100	A	X	A	A	A	A	X	A	A	A	X	B		A	B
Potassium Chlorate	KCrO ₃	< 30	< 100	A	A	A	A	A	A	X	A	A	A	X	B		B	X
Potassium Chloride	KCl		< 100	A	A	A	A	A	A	X	A	A	A	X	B		B	B
Potassium Chromate	K ₂ CrO ₄		< 100	A	A	A	A	A	A	X	A	A	A	X	B		B	B
Potassium Hydroxide	KOH	< 60	< 100	X	A	X	A	A	X	X	A	A	X	X	X		B	X
Potassium Permanganate	KMnO ₄	< 30	< 100	X	A	X	A	A	A	X	A	A	X	X	B		B	B
Potassium Silicate	K ₂ SiO ₄	all	< 100	A	A	A	A	A	A	X	A	A	A	X	B		B	B
Potassium Sulfate	K ₂ SO ₄	< 20	< 100	A	A	A	A	A	A	X	A	A	A	X	A		B	A
Propane Liquid	C ₃ H ₈		< 100	A	X	A	A	A	A	A	A	A	A	A	A		A	A
Propionaldehyde	C ₃ H ₆ O		25	X	A	X	A	A	A	A	A	A	A	A	A		A	A
Propionic Acid	CH ₃ CH ₂ COOH	50	25	X	A	X	A	A	A	X	A	A	A	X	B		A	X
Propylene Liquid	CH ₃ CH=CH ₂		< 100	X	X	A	A	A	A	A	A	A	A	A	A		A	A

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Propylene Glycol	CH ₃ CH(OH)CH ₂ OH		< 100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Propylene Oxide	C ₃ H ₆ O	70	50	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Pyridine	C ₅ H ₅ N	20	< 100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Salicylic Acid	C ₇ H ₆ O ₃	all	25	X	A	A	A	A	A	A	A	A	A	A	B	A	B	B
See Water		10	25	A	A	A	A	A	A	A	A	A	A	A	B	B	A	B
Sewage			< 50	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Silicone Oil			< 100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Silver Chloride	AgCl	10	25	A	A	A	A	A	A	X	A	A	X	X	X	B	B	X
Siver Nitrate	AgNO ₃		< 100	X	A	A	A	A	A	X	A	A	A	X	A	A	A	B
Sodium Acetate	CH ₃ COONa·3H ₂ O	< 60	< 100	X	A	X	A	A	A	A	A	A	A	A	B	A	A	B
Sodium Bicarbonate	NaHCO ₃	< 20	< 100	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A
Sodium Bromide	NaBr	< 50	< 100	X	A	A	A	A	A	X	A	A	X	X	B	B	B	B
Sodium Chlorate	NaClO ₃		< 100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Chloride	NaCl	< 30	< 100	A	A	A	A	A	A	A	A	A	A	A	X	B	A	X
Sodium Chromate	Na ₂ CrO ₄ ·10H ₂ O	all	< 100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Cyanide	NaCN	10	< 100	A	A	X	A	A	A	X	A	A	A	X	X	A	A	X
Sodium Sulfide	Na ₂ S	< 30	< 80	A	A	A	A	A	A	X	A	A	X	X	X	A	B	X
Sodium Sulfite	Na ₂ SO ₃ ·7H ₂ O	10	< 100	A	A	A	A	A	A	X	A	A	A	X	A	A	B	B
Sodium Thiosulfate	Na ₂ S ₂ O ₃ ·5H ₂ O	< 50	< 100	X	A	A	A	A	A	X	A	A	A	X	A	A	B	B
Sodium Hydrosulfide	NaSH·2H ₂ O	< 50	< 80	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Hydrosulfite	Na ₂ SO ₄	10	< 100	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Metasilicate	Na ₂ OSiO ₃ ·5H ₂ O	all	< 100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

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Sodium Nitrate	NaNO ₂	<70	<100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Nitrite	NaNO ₂		<100	X	A	X	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Silicate	Na ₂ SiO ₃	all	<100	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A
Soudium Sulfate	Na ₂ SO ₄	<30	<100	A	A	A	A	A	A	X	A	A	X	X	B	A	B	B
Stannic Chloride	SnCl ₄		<100	A	A	A	A	A	A	X	A	A	X	X	X	X	X	X
Stearic Acid	C ₁₈ H ₃₆ O ₂		<205	X	X	X	A	A	A	A	A	A	A	A	A	A	B	A
Styrene	C ₆ H ₅ CH=CH ₂		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Succinic Acid	COOH(CH ₂) ₂ COOH	50	<100	X	X	X	A	A	A	X	A	A	X	X	B	B	B	A
Sugar Solutions				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Sulfur Dixide	SO ₂		<100	X	X	A	A	A	A	X	A	A	X	X	B	B	B	A
Sulfur Acid	H ₂ SO ₄	10	25	X	X	A	A	A	A	X	A	A	A	X	X	A	X	X
Syrup			<100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Tall Oil				X	X	X	A	A	A	A	A	A	A	A	B	B	A	B
Tannic Acid	C ₇₆ H ₅₂ O ₄₆	all	<100	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A
Tartric Acid	C ₄ H ₆ O ₆	<50	<100	A	X	A	A	A	X	X	A	A	A	X	A	B	A	B
Tetrachloroethane	CHCL ₂ CHCL ₂	90	<100	X	X	A	A	A	A	A	A	A	A	A	X	B	A	X
Tetraethyl Lead	(C ₂ H ₅) ₄ Pb		<100	X	X	A	A	A	A	X	A	A	X	X	B	B	B	B
Tetranydrofurarr	C ₄ H ₈ O			X	X	X	A	A	A	X	A	A	A	X	B	X	A	A
Titanium Tetra Chlonde	TiCL ₄		25	X	X	A	A	A	A	X	A	A	X	X	B	B	B	X
Toluene	C ₆ H ₅ CH ₃		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Thiophene	C ₄ H ₄ S		<50	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Thiophenol	C ₆ H ₅ SH		<100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A

A = Good as ant component

B = Good for glands, collars and compression units

X = Not recommended

LIQUID NAME		APPLI CATION		PACKING					FACES					BODY				
		DENS ITY (%)	TEMPERATURE (°C)	NBR	EPR	VITON	TEFLON	KALREZ	CARBON	TUNGSTEN	SIC	CERAMIC	CERAMIC COATED	TUNGSTEN COATED	SUS316	ALLOY 20	HAS “C”	AM350
Touluidine	C7H9N		< 100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Toothpaste				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Tribasic Sodium Phosphate	NaPO ₃ •12H ₂ O	all	< 100	A	X	A	A	A	A	X	A	A	A	X	X	B	A	X
Trichloroacetic Acid	CCl ₃ COOH		25	X	X	X	A	A	A	X	A	X	X	X	X	B	A	X
Trichlorobenzene	C ₆ H ₅ Cl ₃		25	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Trichloroethylene	CHClCCl ₂	90	< 100	X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Tricresyl Phosphate	(CH ₃ C ₆ H ₄ O) ₃ PO		< 200	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Triethanolamine	(CH ₂ OHCH ₂) ₃ N	all	< 100	A	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Triethylenetetramine	NH ₂ (C ₂ H ₄ NH ₂) ₃ C ₂ H ₄ NH ₂		< 100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Trimethylamine	(CH ₃) ₃ N		< 100	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Tung Oil				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Turpentine Oil			< 100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Urea	CO(NH ₂) ₂	< 50	< 100	X	X	X	A	A	A	A	A	A	X	X	B	B	B	B
Urine				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Vaseline			< 100	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Vegetable Oil				A	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Vetrocoke Solution			< 100	X	X	A	A	A	A	A	A	A	A	A	A	A	A	A
Vinyl Acetate	CH ₃ COOCHCH ₂		25	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Vinyl Chloride Monomer	CH ₂ CHCL			X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Vinyl Chloride Resin				X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
VinylEthyl Ether	CH ₃ CHOCC ₂ H ₅		25	X	X	X	A	A	A	A	A	A	A	A	A	A	A	A
Vinyl Acetate	CH ₃ COOCHCH ₂		25	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

B = Good for glands, collars and compression units

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[illegible]



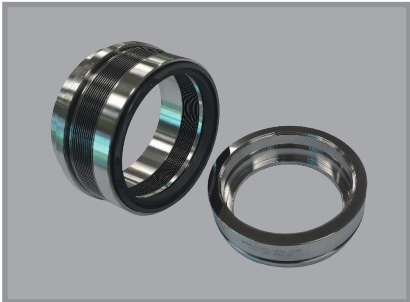
KSL-300



KSL-500



KSL-900



MBV-090



THANK YOU VERY MUCH.

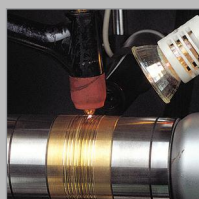


PRODUCT ITEMS

• Welded Metal Bellows Seal



• Mechanical Seal & Unit Seal



• Expansion Joint

• Welded Metal Bellows Kit



• Semiconductor

• Actuator

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