

Mechanical Seals

Cartridge Seals

Component Seals



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Mechanical Seals

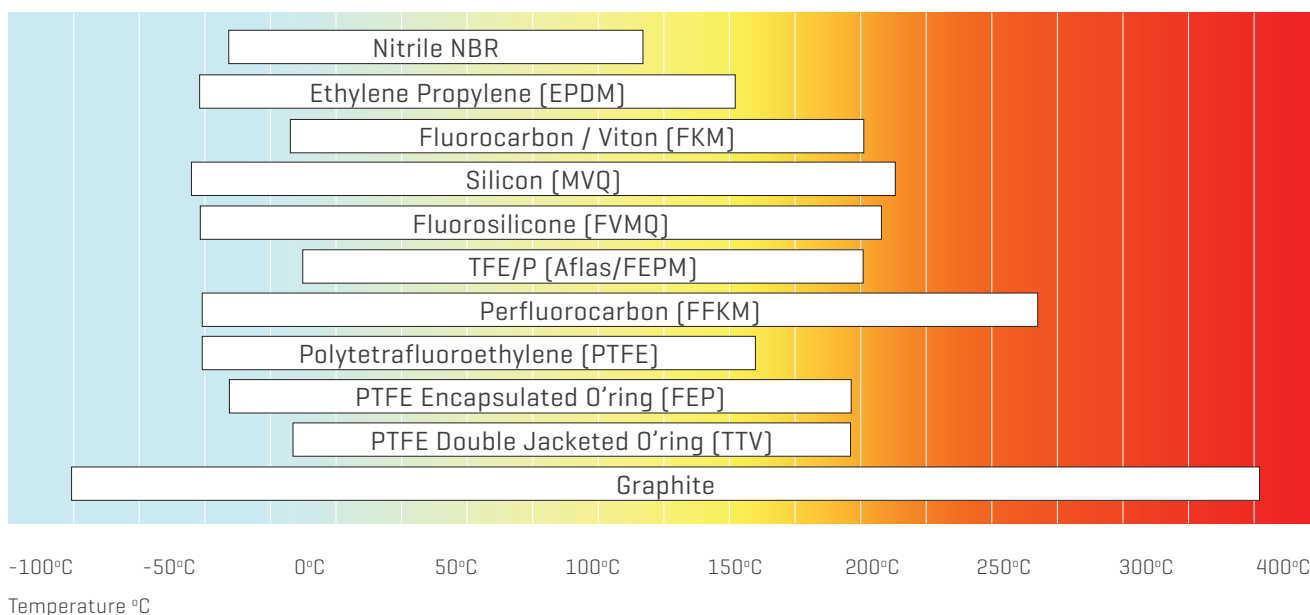
Fajar Benua Indopack was established in 1984, special in engineering services and marketing of sealing products

Mechanical Seal Catalog is a technical book to help users identify standard type of mechanical seal recommendation. This technical book catalog includes product overview, mechanical seal types, seal recommendation and technical reference sections.

Industry applications are provided as well as operating parameters, features and equipment suitability for individual products. The seal type shown here are used as a quick reference to help identify the primary industry application.

For more assistat about Eagle Asmuss Mechanical Seal information please find our sales and location near you or visit our website.

Temperature Range For Common Secondary Seal



Basic Elastomer

Acrylonitrile butadiene, Nitrile or Buna N (NBR)

Nitrile, chemically, is a copolymer of butadiene and acrylonitrile. Acrylonitrile content varies in commercial products from 18% to 50%. As the nitrile content increases, resistance to petroleum base oils and hydrocarbon fuels increases, but low temperature flexibility decreases. Due to its excellent resistance to petroleum products, and its ability to be compounded for service over a temperature range of -35°C to +120°C, nitrile is the most widely used elastomer in the seal industry today.

Also many military rubber specifications for fuel and oil resistant O-rings require nitrile based compounds. It should be mentioned that to obtain good resistance to low temperature, it is often necessary to sacrifice some high temperature resistance. Nitrile compounds are superior to most elastomers with regard to compression set, tear, and abrasion resistance. Nitrile compounds do not possess good resistance to ozone, sunlight, or weather. They should not be stored near electric motors or other ozone generating equipment. They should be kept from direct sunlight. However, this can be improved through compounding. NBR is the standard material for hydraulics and pneumatics. NBR resists oil-based hydraulic fluids, fats, animal and vegetable oils, flame retardant liquids (HFA, HFB, HFC), grease, water, and air.

Special low-temperature compounds are available for mineral oil-based fluids. By hydrogenation, carboxylic acid addition, or PVC blending, the nitrile polymer can

meet a more specified range of physical or chemical requirements.

Ethylene Propylene, and Ethylene Propylene Diene rubber (EPM, EPDM)

Ethylene propylene rubber is an elastomer prepared from ethylene and propylene monomers (ethylene propylene copolymer) and at times with an amount of a third monomer (ethylene propylene terpolymers). Ethylene propylene rubber has a temperature range of -50°C to +150°C, depending on the curing system. It has a great acceptance in the sealing world because of its excellent resistance to heat, water and steam, alkali, mild acidic and oxygenated solvents, ozone, and sunlight. These compounds also withstand the affect of brake fluids and Skydrol™ and other phosphate ester-based hydraulic fluids. EPDM compounds are not recommended for gasoline, petroleum oil and grease, and hydrocarbon environments. Special EPDM compounds have good resistance to steam.

- EPDM Sulphur cured: inexpensive material for normal use, maximum temperature of **+120°C (+250°F)**.
- EPDM Peroxide cured: for hot water, vapor, alcohols, ketones, engine coolants, organic and inorganic acids and bases. Not resistant to mineral oils. For maximum temperatures of **+150°C (+300°F)**.

Fluorocarbon rubber (FKM)

Fluorocarbon elastomers have grown to major importance in the seal industry. Due to its wide range of chemical compatibility, temperature range, low compression set, and excellent aging characteristics, fluorocarbon rubber is the most significant single elastomer developed in recent history.

Fluorocarbon elastomers are highly fluorinated carbon-based polymers used in applications to resist harsh chemical and ozone attack. The working temperature range is considered to be -26°C to +205°C. But for short working periods it will take even higher temperatures. Special compounds having improved chemical resistance are also available with new types always being developed. Generally speaking, with increasing fluorine content, resistance to chemical attack is improved while low temperature characteristics are diminished. There are, however, specialty grade fluorocarbons that can provide high fluorine content with low temperature properties.

Fluorocarbon O-rings should be considered for use in aircraft, automobile and other mechanical devices requiring maximum resistance to elevated temperatures and to many fluids. FKM (FPM, Viton®, Fluorel®) resist mineral oils and greases, aliphatic, aromatic and also special chlorinated hydrocarbons, petrol, diesel fuels, silicone oils and greases. It is suitable for high vacuum applications. Many fluorocarbon compounds have a higher than normal mold shrinkage rate, molds for fluorocarbon products are often different from molds for Nitrile.

Silicone rubber (MVQ)

Silicones are a group of elastomeric materials made from silicone, oxygen, hydrogen, and carbon. Extreme temperature range and low temperature flexibility are characteristics of silicone compounds. As a group, silicones have poor tensile strength, tear resistance, and abrasion resistance. Special compounds have been developed with exceptional heat and compression set resistance. High strength compounds have also been made, but their strength does not compare to conventional rubber. Silicones possess excellent resistance to extreme temperatures -50°C to + 232°C.

Some special compounds resist even higher temperatures. Retention of properties of silicone at high temperature is superior to most other elastic materials. Silicone compounds are very clean and are used in many food and medical applications because they do not impart odor or taste. Silicone compounds are not recommended for dynamic O-ring sealing applications due to relatively low tear strength and high coefficient of friction. Silicone is resistant to hot

air, ozone, UV radiation, engine and transmission oils, animal and vegetable fats and oils, and brake fluids. MVQ also has low resistance to mineral oils. Silicone can be compounded to be electrically resistant, conductive, or flame retardant.

Many silicone compounds have a higher than normal mold shrinkage. Therefore production molds for silicone products are often different than molds for nitrile.

Perfluorocarbons (FFKM)

The relative inertness of fluorocarbon rubbers is provided by fluorine-carbon bonds on the elastomer backbone. Generally speaking, with increasing fluorine content, resistance to chemical attack is improved. Where fluorocarbon rubbers have a fluorine content of 63 - 68 %, the perfluorocarbons have a fluorine content of 73%. Perfluorelastomers possess excellent resistance to extreme temperatures -26°C to +260°C. FFKM perfluoroelastomers: (Kalrez®) offers the best chemical resistance of all elastomers.

Some types are particularly suitable for hot water, steam and hot amines. Some resist temperatures up to +326°C (+620°F). Many perfluorocarbon compounds have unusual mold shrinkage, production molds for perfluorocarbon products are different from molds for nitrile.

Teflon®-FEP/PFA

Teflon® FEP/PFA is a copolymer of tetrafluoroethylene and hexafluoropropylene. Teflon® FEP/PFA has a lower melting point than PTFE making it suitable for injection moulding.

Teflon® FEP/PFA is used for encapsulation with Teflex O-rings. Teflon® FEP/PFA has a wide spectrum of chemical compatibility and temperature range and excellent aging characteristics. Maximum operating temperature for

Teflon® FEP/PFA is +205°C (+400°F). A Teflon® FEP/PFA encapsulation is available for higher temperatures [260°C].

TFE/P (Aflas®) (FEPM)

TFE/P is a copolymer of tetrafluoroethylene and propylene with a fluorine content of app. 54%. This material is unique due to its resistance to petroleum products, steam, and phosphate-esters. In some respects it exhibits media compatibility properties similar to ethylene propylene and fluorocarbon.

The compression set resistance at high temperatures is inferior to standard fluorocarbons. Service temperatures are -5°C (25°F) to +204°C (+400°F).

TFE/P provides improved chemical resistance to a wide spectrum of automotive fluids and additives. It is resistant to engine oils of all types, engine coolants with high level of rust inhibitors, extreme pressure (EP) gear lubricants, transmission and power steering fluids, and all types of brake fluids including DOT 3, mineral oil, and silicone oil. TFE/P is ideal for heat transfer media,

Fluorosilicone (FVMQ)

Fluorosilicone combines the good high- and low-temperature properties of silicone with limited fuel and oil resistance. Fluorosilicones provide a much wider operational temperature range than Fluorocarbon rubbers. Primary uses of fluorosilicone O-rings are in fuel systems at temperatures up to +177°C (+350°F) and in applications where the dry-heat resistance of silicone O-rings are required.

Fluorosilicone O-rings may also be exposed to

petroleum based oils and/or hydro-carbon fuels. In some fuels and oils; however, the high temperature limit in the fluid list is more conservative because fluid temperatures approaching 200°C (390°F) may degrade the fluid, producing acids which attack fluorosilicone O-rings. For low temperature applications, fluorosilicone O-rings seal at temperatures as low as -73°C (-100°F). Due to relatively low tear strength, high friction and limited abrasion resistance of these materials, they are generally recommended for static applications only.

Fluorosilicones with high tear strength are also available. Some of these compounds exhibit improved resistance to compression set. Many fluorosilicone compounds have a higher than normal shrinkage rate so production.

Seal Material

Component	Garuda Seals	Coding	Description
Faces	CB	G	Carbon Graphite, Resin
	Si C S	S	Silicon Carbide, Sintered
	Si C R	R	Silicon Carbide, Reaction Bonded
	TC-Ni	N	Tungsten Carbide, Ni Bonded
	TC-Co	O	Tungsten Carbide, Cobalt Bonded
	CR	H	Aluminium Oxide
Metals	316	S	CrNiMo Steel [1.4401]
	Alloy-20	A	20Cr3 [2.4660]
	HC	H	Hastelloy C-276 [2.4819]
	HB	B	Hastelloy B [2.4617]
	Ti	T	Titanium [3.7035]
	Inconel	I	Inconel 718
	Monel	M	Monel [2.4375]
Elastomer	NBR	N	Nitrile
	EPDM	E	Ethylene Propylene
	MVQ	S	Silicon
	FKM	V	Fluorocarbon
	FFKM	K	Perfluorocarbon
	FEP	F	PTFE Encapsulated O'ring

Codes :

C : Carbon SSiC : Sintered SiCar RBSiC : Reaction Bonded SiCar TC : Tungsten Carbide

Seal Selection Checklist

Mechanical	Fluid	Parameter	System
Pump Condition	Concentration	Pressures	Batch Operation
Pump Design	Carrier Fluids	Temperatures	Continuous
Pump Dimensions	Cleaning Fluids	Shaft Speed	Environmental Control
Motor Requirement	Fluid Additive	Shaft Size	
	Percent Solids		

Seal Face Compatibility

	Ceramic	Stellite	Nickel Bound TC	RB SiC	Alpha Sint. SiC	Bronze	Carbon
Ceramic	D	X	X	D	D	X	ABCD
Stellite	X	D	D	X	X	D	ACDE
TC. Nickel Bound	X	D	BCD	ABD	ABCD	BD	BCDE
Si-C. React. Bond	D	X	BD	ABD	ABD	X	ABDE
Si-C. Alpha Sint.	D	X	BCD	ABD	ABCD	X	ABCDE
Bronze	X	D	BD	X	X	X	X
Carbon	ABCD	ACDE	BCD	ABDE	ABCDE	X	ABCD

Codes :

- A. Acids diluted and concentrated
- B. Water and water solution
- C. Caustics diluted and concentrated
- D. Dry running
- X. Not recommended

Temperature Limitations of Seal Face Materials

Materials	Construction	Max. Temp	
		°F	°C
Stellite	Welded Stellite Face on Metal Ring	350	177
TC	Solid Tungsten Carbide Ring	750	400
Bronze	Solid Leaded Bronze Ring	350	177
Ceramic	Solid Pure Ceramic Ring	350	177
Carbon	Solid Carbon-Graphite Ring	525	275
Silicon-Carbide	Solid Silicon Carbide Ring	800	427

STANDARD STATIONARY SEAT TYPE CUSHION [CX / A4]

Material : Silicon Carbide & Tungsten Carbide

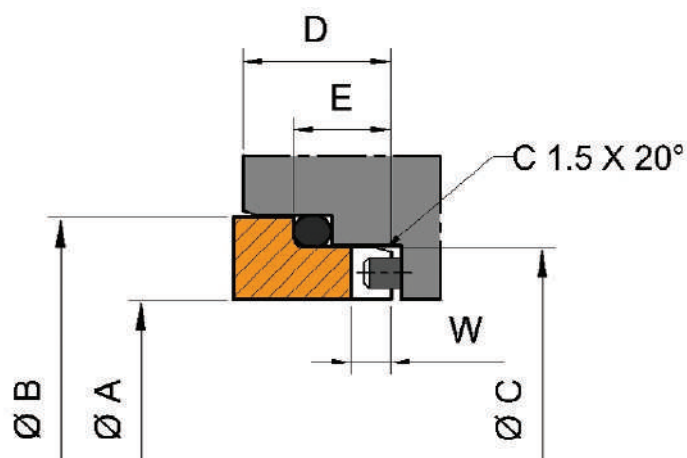
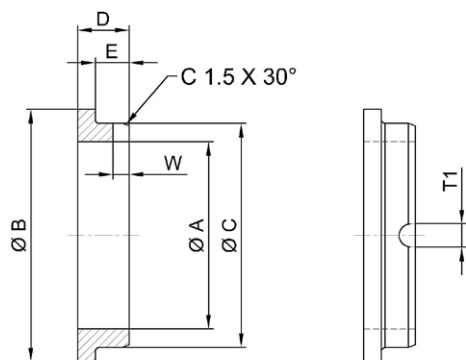


TABLE
STANDARD "STATIONARY"
TYPE : CUSHION [CX / A4]



DASH	SEAL SIZE	ID [A]	OD [B]	[C]	[D]	[E]	W X T1	O'RING NUMBER
-12	3/4"	20.50	34.60	28.50	10.80	6.80	3.5	216
-14	7/8"	23.50	37.80	31.65	10.80	6.80	3.5	218
-15	15/16"	25.40	39.40	33.25	11.10	8.00	3.5 X 5	220
-16	1"	27.00	40.95	34.85	11.10	8.00	3.5 X 5	220
-18	1 1/8"	30.20	44.15	37.70	11.10	8.00	3.5 X 5	222
-20	1 1/4"	33.30	47.30	41.20	11.10	8.00	3.5 X 5	223
-22	1 3/8"	36.50	50.50	44.35	11.10	8.00	3.5 X 5	224
-24	1 1/2"	39.80	53.65	47.55	11.10	8.00	3.5 X 5	225
-26	1 5/8"	43.00	60.00	53.90	12.70	8.20	3.5 X 5	227
-28	1 3/4"	46.20	63.20	57.05	12.70	8.20	3.5 X 5	228
-30	1 7/8"	49.30	66.35	60.25	12.70	8.20	3.5 X 5	229
-32	2"	52.80	69.55	63.40	12.70	8.20	3.5 X 5	230
-34	2 1/8"	56.00	75.80	69.75	14.30	9.00	4 X 6	232
-36	2 1/4"	59.15	78.95	72.95	14.30	9.00	4 X 6	233
-38	2 3/8"	62.30	82.15	76.10	14.30	9.00	4 X 6	234
-40	2 1/2"	65.50	85.30	79.30	14.30	9.00	4 X 6	235
-42	2 5/8"	68.70	85.30	79.30	15.90	9.80	4 X 6	235
-44	2 3/4"	71.90	88.50	82.45	15.90	9.80	4 X 6	236
-46	2 7/8"	75.00	94.85	85.50	15.90	9.80	4 X 6	340
-48	3"	78.20	98.00	88.60	15.90	9.80	4 X 6	341
-50	3 1/8"	81.40	101.20	91.80	15.90	9.80	4 X 6	342
-52	3 1/4"	84.60	104.35	95.00	15.90	9.80	4 X 6	343
-54	3 3/8"	87.70	107.55	98.20	15.90	9.80	4 X 6	344
-56	3 1/2"	90.90	110.70	101.30	15.90	9.80	4 X 6	345
-58	3 5/8"	94.10	113.90	104.50	17.50	10.30	4 X 6	346
-60	3 3/4"	97.30	117.05	107.70	17.50	10.30	4 X 6	347
-62	3 7/8"	101.00	120.25	110.85	17.50	10.30	4 X 6	348
-64	4"	104.10	123.40	114.05	17.50	10.30	4 X 6	349
-68	4 1/4"	110.15	129.70	120.40	17.50	10.30	4 X 6	351
-72	4 1/2"	116.80	136.05	126.75	17.50	10.30	4 X 6	353
-76	4 3/4"	123.15	142.40	133.10	17.50	10.30	4 X 6	355
-80	5"	129.50	151.90	142.60	17.50	10.30	4 X 6	358
-84	5 1/4"	135.90	158.25	148.95	17.50	10.30	4 X 6	360
-88	5 1/2"	142.20	164.60	155.30	17.50	10.30	4 X 6	361
-82	5 3/4"	148.60	170.95	161.15	17.50	10.30	4 X 6	362
-96	6"	154.90	177.30	168.00	17.50	10.30	4 X 6	363

STANDARD STATIONARY SEAT TYPE GROOVE [GX / B1]

Material : Silicon Carbide & Tungsten Carbide

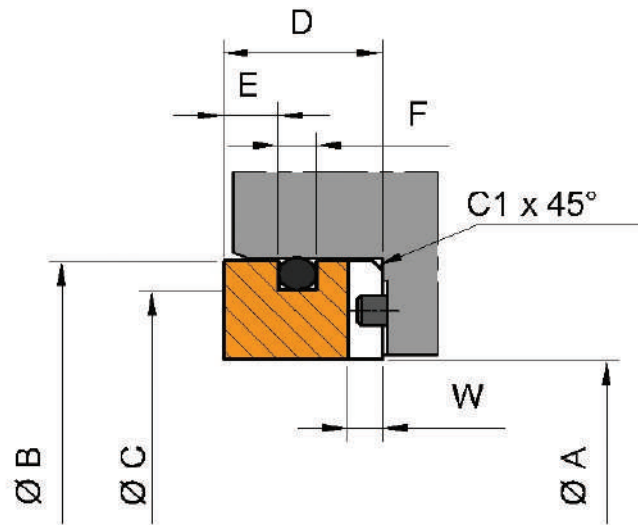
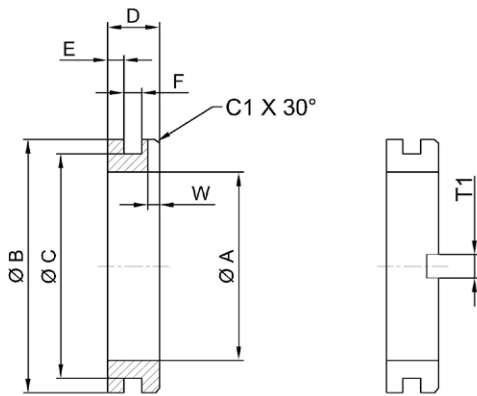


TABLE
STANDARD "STATIONARY"
TYPE : GROOVE [GX / B1]



DASH	SEAL SIZE	ID [A]	OD [B]	[C]	[D]	[E]	W X T1	O'RING NUMBER
-12	3/4"	20.50	34.60	28.50	10.30	3.00	3.5	216
-14	7/8"	23.50	37.80	31.65	10.30	3.00	3.5	218
-15	15/16"	25.40	39.40	33.25	11.10	3.50	3.5 X 5	219
-16	1"	27.00	40.95	34.85	11.10	3.50	3.5 X 5	220
-18	1 1/8"	30.20	44.15	37.70	11.10	3.50	3.5 X 5	222
-20	1 1/4"	33.30	47.30	41.20	11.10	3.50	3.5 X 5	223
-22	1 3/8"	36.50	50.50	44.35	11.10	3.50	3.5 X 5	224
-24	1 1/2"	39.80	53.65	47.55	11.10	3.50	3.5 X 5	225
-26	1 5/8"	43.00	60.00	53.90	12.70	4.00	3.5 X 5	227
-28	1 3/4"	46.20	63.20	57.05	12.70	4.00	3.5 X 5	228
-30	1 7/8"	49.30	66.35	60.25	12.70	4.00	3.5 X 5	229
-32	2"	52.80	69.55	63.40	12.70	4.00	3.5 X 5	230
-34	2 1/8"	56.00	75.80	69.75	14.30	5.00	4 X 6	232
-36	2 1/4"	59.15	78.95	72.95	14.30	5.00	4 X 6	233
-38	2 3/8"	62.30	82.15	76.10	14.30	5.00	4 X 6	234
-40	2 1/2"	65.50	85.30	79.30	14.30	5.00	4 X 6	235
-42	2 5/8"	68.70	85.30	79.30	15.90	5.50	4 X 6	235
-44	2 3/4"	71.90	88.50	82.45	15.90	5.50	4 X 6	236
-46	2 7/8"	75.00	94.85	85.50	15.90	5.50	4 X 6	238
-48	3"	78.20	98.00	88.60	15.90	5.50	4 X 6	239
-50	3 1/8"	81.40	101.20	91.80	15.90	5.50	4 X 6	240
-52	3 1/4"	84.60	104.35	95.00	15.90	5.50	4 X 6	241
-54	3 3/8"	87.70	107.55	98.20	15.90	5.50	4 X 6	242
-56	3 1/2"	90.90	110.70	101.30	15.90	5.50	4 X 6	243
-58	3 5/8"	94.10	113.90	104.50	17.50	5.50	4 X 6	346
-60	3 3/4"	97.30	117.05	107.70	17.50	5.50	4 X 6	347
-62	3 7/8"	101.00	120.25	110.85	17.50	5.50	4 X 6	348
-64	4"	104.10	123.40	114.05	17.50	5.50	4 X 6	349
-68	4 1/4"	110.15	129.70	120.40	17.50	5.50	4 X 6	351
-72	4 1/2"	116.80	136.05	126.75	17.50	5.50	4 X 6	353
-76	4 3/4"	123.15	142.40	133.10	17.50	5.50	4 X 6	355
-80	5"	129.50	151.90	142.60	17.50	5.50	4 X 6	358
-84	5 1/4"	135.90	158.25	148.95	17.50	5.50	4 X 6	360
-88	5 1/2"	142.20	164.60	155.30	17.50	5.50	4 X 6	361
-82	5 3/4"	148.60	170.95	161.15	17.50	5.50	4 X 6	362
-96	6"	154.90	177.30	168.00	17.50	5.50	4 X 6	363

STANDARD STATIONARY SEAT TYPE BLOCK (BX / B0)

Material : Silicon Carbide & Tungsten Carbide

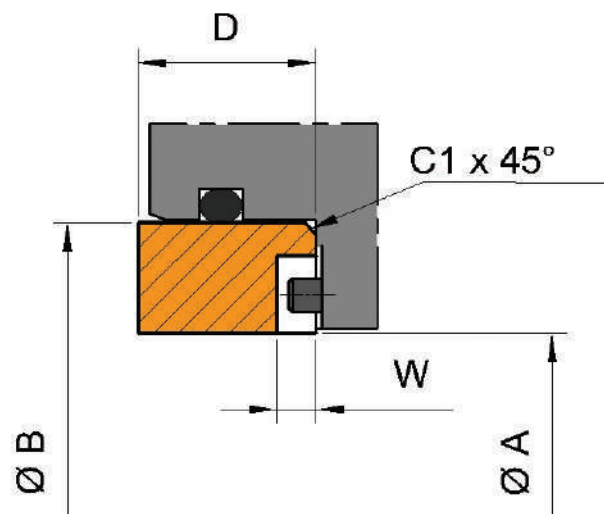
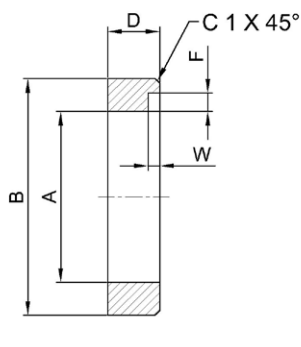


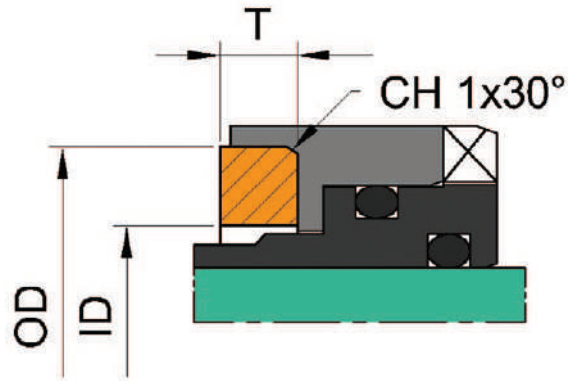
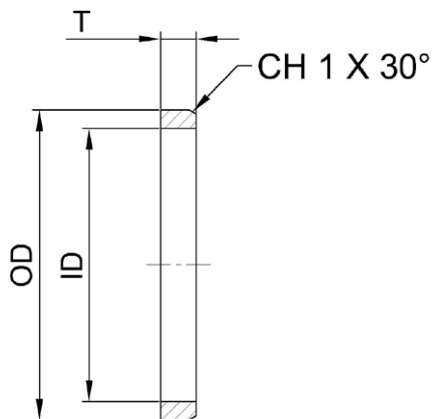
TABLE
STANDARD "STATIONARY"
TYPE : BLOCK (BX / B0)



DASH	SEAL SIZE	ID [A]	OD [B]	[D]	[F]	W X T1	O'RING NUMBER
- 12	3/4"	20.50	34.60	10.30	3.90	2.5 x 5	220
- 14	7/8"	23.90	37.90	10.30	3.90	2.5 x 5	222
- 15	15/16"	25.40	39.40	11.10	3.90	2.5 x 5	223
- 16	1"	27.00	40.95	11.10	3.90	2.5 x 5	223
- 19	1 1/8"	30.20	44.15	11.10	3.90	2.5 x 5	224
- 20	1 1/4"	33.30	47.30	11.10	3.90	2.5 x 5	225
- 22	1 3/8"	36.50	50.50	11.10	3.90	2.5 x 5	226
- 24	1 1/2"	39.80	53.65	11.10	3.90	2.5 x 5	227
- 26	1 5/8"	43.00	60.00	12.70	3.90	3 x 6	229
- 29	1 3/4"	46.20	63.20	12.70	3.90	3 x 6	230
- 30	1 7/8"	49.30	66.35	12.70	3.90	3 x 6	231
- 32	2"	52.80	69.55	12.70	3.90	3 x 6	232
- 34	2 1/8"	56.00	75.90	14.30	3.90	3 x 6	234
- 36	2 1/4"	59.15	78.95	14.30	3.90	3 x 6	235
- 39	2 3/8"	62.30	82.15	14.30	3.90	3 x 6	236
- 40	2 1/2"	65.50	85.30	14.30	3.90	3 x 6	237
- 42	2 5/8"	68.70	85.30	15.90	3.90	3.5 x 7	237
- 44	2 3/4"	71.90	88.50	15.90	3.90	3.5 x 7	239
- 45	2 7/8"	75.00	94.85	15.90	3.90	3.5 x 7	240
- 49	3"	78.20	98.00	15.90	3.90	3.5 x 7	241
- 50	3 1/8"	81.40	101.20	15.90	3.90	3.5 x 7	242
- 52	3 1/4"	84.60	104.35	15.90	3.90	3.5 x 7	243
- 54	3 3/8"	87.70	107.55	15.90	3.90	3.5 x 7	244
- 56	3 1/2"	90.90	110.70	15.90	3.90	3.5 x 7	245
- 59	3 5/8"	94.10	113.90	17.50	5.90	4 x 9	349
- 60	3 3/4"	97.30	117.05	17.50	5.90	4 x 9	350
- 62	3 7/8"	101.00	120.25	17.50	5.90	4 x 9	351
- 64	4"	104.10	123.44	17.50	5.90	4 x 9	352
- 69	4 1/4"	110.45	129.70	17.50	5.90	4 x 9	354
- 72	4 1/2"	116.80	136.05	17.50	5.90	4 x 9	356
- 76	4 3/4"	123.15	142.40	17.50	5.90	4 x 9	359
- 80	5"	129.50	151.90	17.50	5.90	4 x 9	361
- 84	5 1/4"	135.80	158.25	17.50	5.90	4 x 9	362
- 89	5 1/2"	142.20	164.60	17.50	5.90	4 x 9	363
- 92	5 3/4"	148.60	170.95	17.50	5.90	4 x 9	364
- 96	6"	154.90	177.30	17.50	5.90	4 x 9	365

STANDARD SEAL FACE TYPE RING [R1 / R2] for INSERT

Material : Silicon Carbide & Tungsten Carbide

STANDARD RING FACE
SILICON CARBIDE &
TUNGSTEN CARBIDE

SEAL SIZE INCHI	DASH NUMBER	T.C RING (R1)			T.C RING (R2)		
		O.D [mm]	I.D [mm]	T [mm]	O.D [mm]	I.D [mm]	T [mm]
5/8"	X 10	27.05	21.90	5.00	27.00	19.50	5.00
3/4"	X 12	30.10	25.00	5.00	30.10	22.60	5.00
7/8"	X 14	33.35	28.20	5.00	33.30	25.90	5.00
0.937"	X 15	34.95	29.70	5.00	-	-	-
1"	X 16	36.50	31.30	5.00	36.50	29.10	5.00
1 1/8"	X 18	39.75	34.50	5.00	39.70	32.25	5.10
1 1/4"	X 20	43.65	38.50	5.00	43.70	35.50	5.20
1 3/8"	X 22	46.85	41.50	5.50	46.90	38.60	5.50
1 1/2"	X 24	50.05	43.50	5.50	50.00	41.85	5.60
1 5/8"	X 26	53.20	46.50	5.50	53.15	45.05	5.60
1 3/4"	X 28	56.40	49.90	6.00	56.40	48.20	5.80
1 7/8"	X 30	59.55	53.00	6.00	59.45	51.45	6.00
2"	X 32	62.75	55.80	6.00	62.80	54.60	6.10
2 1/8"	X 34	65.90	59.40	6.50	65.90	57.80	6.30
2 1/4"	X 36	69.10	62.60	6.50	69.08	60.95	6.50
2 3/8"	X 38	72.30	65.70	6.50	72.30	64.10	6.50
2 1/2"	X 40	78.65	70.80	6.50	78.50	65.80	6.50
2 5/8"	X 42	81.80	74.00	7.00	81.80	68.95	6.70
2 3/4"	X 44	85.00	77.20	7.00	85.00	72.10	6.90
2 7/8"	X 46	88.95	81.00	7.00	89.00	74.90	7.00
3"	X 48	94.65	84.30	7.10	92.10	78.10	7.10
3 1/8"	X 50	95.80	87.20	7.20	95.80	81.00	7.20
3 1/4"	X 52	99.00	90.40	7.35	99.00	84.20	7.30
3 3/8"	X 54	102.15	93.50	7.50	102.05	87.45	7.50
3 1/2"	X 56	105.35	96.80	7.50	105.20	90.65	7.60
3 5/8"	X 58	108.50	100.00	7.50	108.50	93.80	7.70
3 3/4"	X 60	110.90	103.00	8.00	111.20	97.20	7.80
3 7/8"	X 62	114.85	106.30	8.00	114.85	100.15	7.90
4"	X 64	118.05	109.50	8.00	118.00	103.00	7.90
4 1/4"	X 68	115.25	114.80	8.50	124.85	109.50	8.50
4 1/2"	X 72	131.20	121.20	9.00	131.20	115.80	9.00
4 3/4"	X 76	137.55	127.50	9.50	137.60	122.20	9.50
5"	X 80	143.90	133.90	9.50	144.00	128.50	9.50
5 1/4"	X 84	150.90	139.90	9.50	-	-	-
5 1/2"	X 88	157.25	146.20	9.50	-	-	-
5 3/4"	X 92	163.60	152.50	9.50	-	-	-

Application Limits for Unbalanced Seals

Seal ID [in]	Shaft Speed [rpm]	Sealing Pressure [bar]
½" - 2"	Up to 1800	12
	1801 To 3600	7
Over 2"	Up to 1800	
	1801 To 3600	3.5

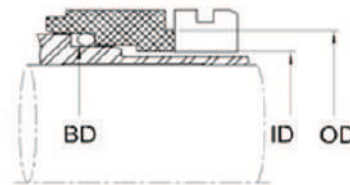
Basic Design Principles

Seal Balance Ratio

As a means of quantifying the amount, or percent, of balance for a mechanical seal, a ratio can be made between the seal face area above the balance diameter versus the total seal face area. This ratio can also be expressed as the area of the seal face exposed to hydraulic closing force versus the total seal face area. In either case, referring to figure, the mathematical expression for the balance ratio of an inside seal design is :

$$\text{Balance Ratio} = \frac{OD^2 - BD^2}{OD^2 - ID^2}$$

- OD** seal face outside diameter
- ID** seal face inside diameter
- BD** balance diameter of the seal



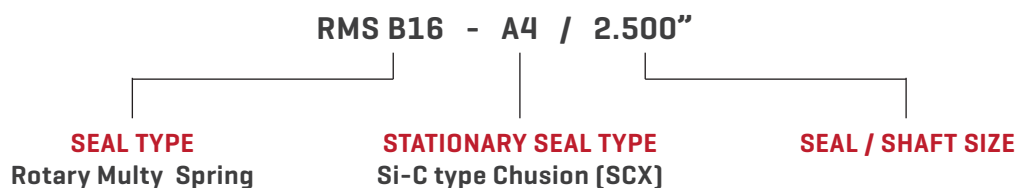
As a general rule of thumb, balance seal designs use a balance ratio of 0.75 for water and nonflashing hydrocarbon. For flashing hydrocarbons, which are fluids with a vapor pressure greater than atmospheric pressure at the service temperature, the balance ratio is typically 0.80 to 0.85.

Unbalanced seal designs typically have a ratio of 1.25 to 1.35.

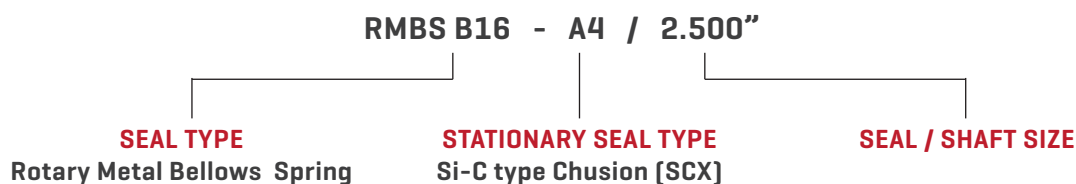
Mechanical Seals According

	Single Seal													Double Seal				
Designation Example	Process Side / Medium Side													Atmosphere				
	RMS U-11	-	A4	/	55	-	C	S	V	H	S	-	C	S	V	H	S	
Seal Type																		
RMS-U11, RSS-U11, RBES-XX																		
RMS-B13, RMS-B16, RSS-13,DRS-X																		
RMBS-13, RMBS-HT16, SMBS-HT14																		
EA-400-SC, EA-400-DC																		
RMS-B13-SC, RMS-B13-DC																		
RMBS-B13-SC, RMBS-B13-DC																		
RMBS-B16-SC, RMBS-HT-DC																		
SMBS-HT14-SC																		
Stationary Seat Type																		
A-4 [CX], A-5, A-9, B-0, [BX], B-1 [GX], X																		
Seal Size / Shaft or Sleeve Size																		
Metric [mm] , Imperial [inch]																		
Rotary Face Material																		
Stationary Seat Material																		
A - Carbon Antimony		O - TC [Co-Bonded]																
C - Carbon Filled PTFE		H - Chrome Oxide																
G - Carbon Graphite		2 - Insert Carbon + SUS																
K - Ceramic		3 - Insert Sil-Car + SUS																
M- Metal		4 - Insert TC + SUS																
T - Glass Filled PTFE		X - Special																
S - Si-C [Alpha Sintered]																		
R - Si-C [Reaction Bonded]																		
N - TC [Ni-Bonded]																		
Secondary, Flexible Seal Material																		
N - Nitrile [NBR]		T - PTFE																
E - Ethylene Propylene [EPDM]		F - PTFE Encapsuleated O’ring [FEP]																
S - Silicon [MVQ]		M - PTFE Double Jacketed O’ring [TTV]																
V - Fluorocarbon / Viton [FKM]		X - Customer Specification																
A- Tetrafluoroethylene [FEPM]																		
K - Perfluorocarbon [FFKM]																		
G - Graphite																		
Spring Material																		
Metal Part Material																		
S - SUS 316		C - Carpenter / Alloy 42																
L - SUS 316 L		T - Titanium																
O - SUS 304		X - Customer Specification																
D - SUS 329 / Duplex																		
H - Hastelloy C																		
B - Hastelloy B																		
A - AM 350																		
I - Inconel 71B																		
M- Monel																		

1-Pusher Type / Rotary Multy Spring, ITEM CODE



2-Non Pusher Type / Bellows Type Seal, ITEM CODE



Design Example 01 ; Type Multy Spring -RMS B 13 basic, seal size 2,5" :

- ITEM CODE : RMS B13-A4/2,5" atau

- ITEM CODE : RMS B16-A4/2,5"

Design Example 02 ; Type Metal Bellows-RMBS B 13 basic, seal size 2,5" :

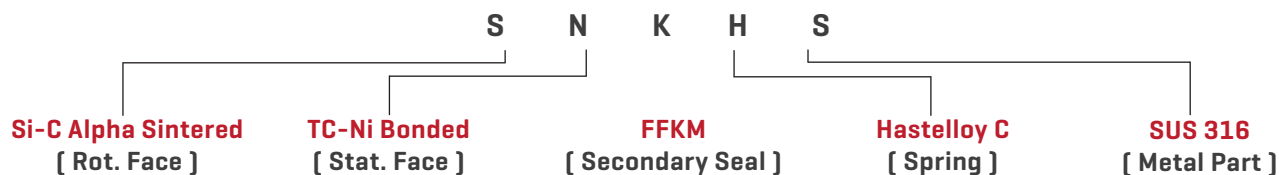
- ITEM CODE : RMBS B13-A4/2,5" atau

- ITEM CODE : SMBS B14-A4/2,5"-

3-Pusher Type Seals, material codes



4-Non Pusher Type / Bellows Type Seals, Material Codes



Design Example 01 ; Type RMS-B 13 basic , seal size 2,5" :

- SEAL CODE : RMS B13-A4/2,5"-GSVHS atau

- SEAL CODE : RMS B13-A4/2,5"-2SVHS [Rot. Insert]

Design Example 02 ; Type RMS-B 13 cartridge single seal , shaft size 2,5" :

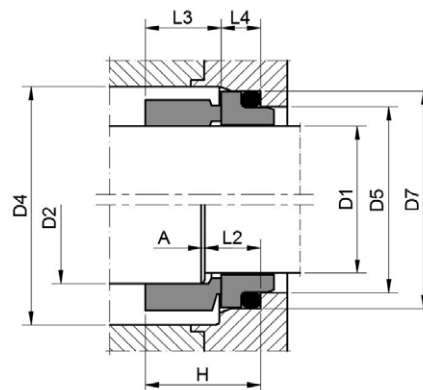
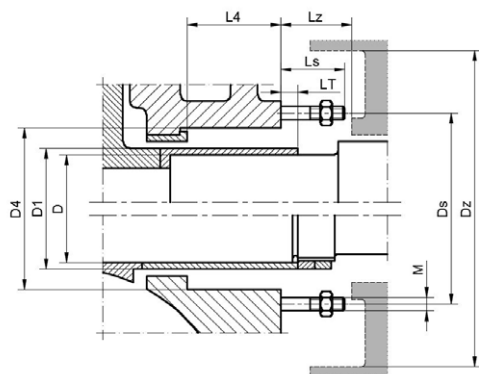
- SEAL CODE : RMS B13 S-A4/2,5"-GSVHS atau

- SEAL CODE : RMS B13 S-A4/2,5"-2SVHS [Rot. Insert]

Design Example 03 ; Type EA-400 single seal, shaft size 2,5" :

- SEAL CODE : EA-400-X/2,5"-32VHS [Rot/Stat. Insert]

Seal Installation Dimensions

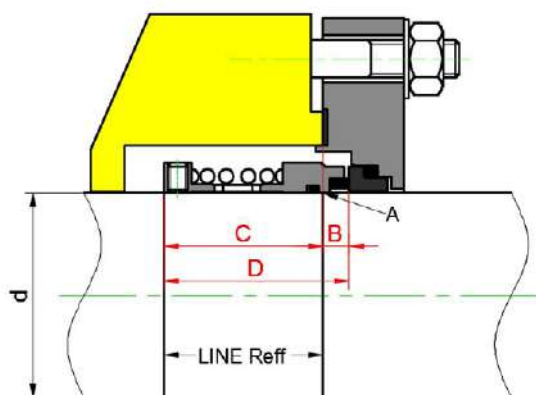


	Stuffing Box With Compression Packing
D'	Shaft Step O.D
D	Shaft O.D
D1	Sleeve O.D
D4	Stuffing Box Bore
D2	Gland Bolts Circle (PCD)
D3	Free Zone I.D
L4	Box Chamber Depth
L2	Length of Bolts
L1	End of Sleeve
L3	Length to Nearest Obstruction
M	Size of Bolt
n	Quantity of Bolt

	Stuffing Box With Mechanical Seal
D1	Shaft / Sleeve O.D
D2	Shaft Stage O.D
D3	Pilot Gland I.D
D4	Stuffing Box I.D
D5	Gland Plate Hole I.D
D7	Seat I.D
L2	Distance Between Shaft Step and Seat Base
L3	Seal Rotating Unit Length
L4	Stationary unit Length
H	Total Length of Seal After Assembling
A	Chamfer

Installation Manual

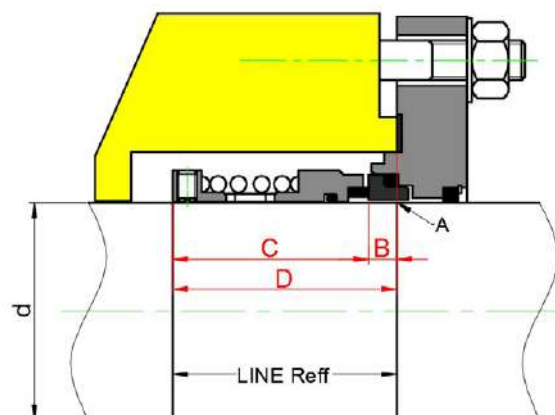
A- Stuffing Box Face
B- Insert Extends in to Box
D- Seal Setting from Line Reff.



Setting for Inside Seal With Recessed Insert

D = Seal Setting from Line Reff.
D = C - B

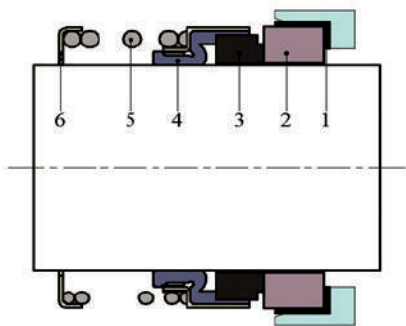
A- Stuffing Box Face
B- Insert Extends in to Box
D- Seal Setting from Line Reff.



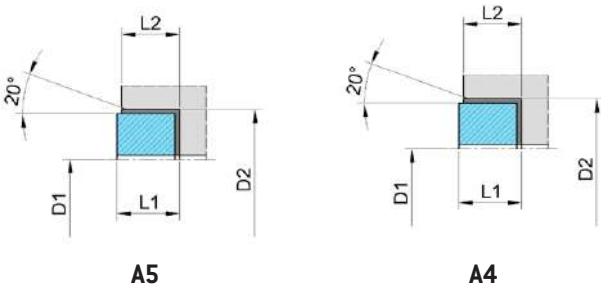
Setting for Inside Seal With Raised Insert

D = Seal Setting from Line Reff.
D = C + B

REBS – Rotary Elastomer Bellow Seal Type 1



STATIONARY RINGS



STATIONARY RINGS	
A4	A5

REBS. Mechanical Seal

Elastomer bellows seal, non-clogging, single coil spring. The drive band’s notch design eliminates over stressing of the bellows.

Materials

Seal Face	Carbon, SiC, Ceramic
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomer

Seal Characteristic

- Single Seal
- Balanced Seal
- Independent of direction.

Applications

- Centrifugal, hydraulic pump
- Compressors, mixers, chillers

Components

1. Stationary Packing
2. Stationary Face
3. Rotary Face
4. Rubber Bellows
5. Spring
6. Stopper

Performance Range

Shaft Diameter	25 – 50mm
Pressure	6 bar [max]
Temperature	-20 ~ 160 °C
Velocity	10 m/sec

REBS – Rotary Elastomer Bellow Seal Type 2



REBS. Mechanical Seal

Compact, unitized, single spring, elastomer bellows seal. Easy installation and the full-convolution elastomer bellows provide maximum flexibility in compensating for shaft movement and wear.

Materials

Seal Face	Carbon, SiC, Ceramic
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomer

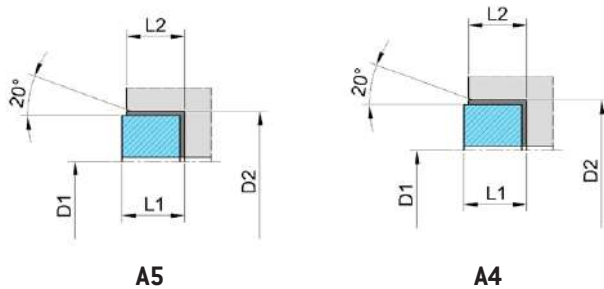
Seal Characteristic

- Single Seal
- Balanced Seal
- Independent of direction.

Applications

- Centrifugal Water pump
- Wastewater pump
- Swimming pool pump
- Deep and Shallow well Jet pump

STATIONARY RINGS



STATIONARY RINGS	
A4	A5

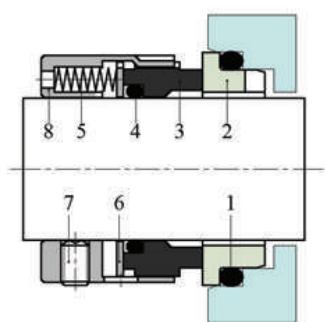
Components

1. Stationary Packing
2. Stationary Face
3. Rotary Face
4. Spring
5. Rubber Bellows

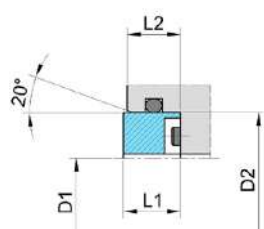
Performance Range

Shaft Diameter	25 – 50mm
Pressure	6 bar [max]
Temperature	-20 ~ 160 °C
Velocity	10 m/sec

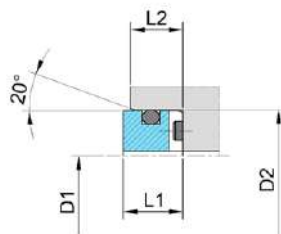
RMS U-11 - Rotary Multi Spring Unbalance Type



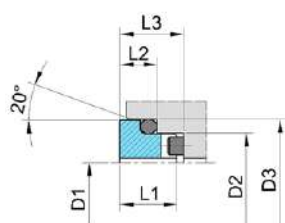
STATIONARY RINGS



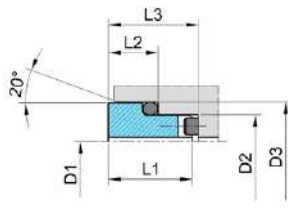
B0



B1



A4



A9

STATIONARY RINGS	
B1	B0
A4	A9

RMS U-11. Unbalanced Mechanical Seal.

Multi spring type, pusher type unbalanced seals suitable for universal application used. The seals are compact in design suiting all types of rotating equipments, pump and mixers. Drivelugs in the retainer will provide torque transmission and reduce slippage on shaft and sleeve.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers PTFE Wedge [<i>Special Design</i>]

Seal Characteristic

- Single Seal
- Balanced Seal
- Independent of direction.

Applications

- General Chemicals.
- Petrochemicals.
- Refineries.
- Light hydrocarbons, water

Components

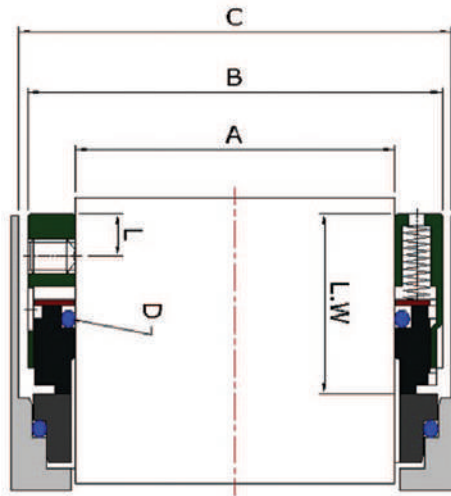
1. Stationary Packing
2. Stationary Face
3. Rotary Face
4. Rotary Packing
5. Spring
6. Back Up Ring
7. Set Screw
8. Spring Holder

Performance Range

Shaft Diameter	25 – 120mm
Pressure	10 bar [max]
Temperature	-20 ~ 240 °C
Velocity	20 m/sec

RMS U-11 - Rotary Multi Spring Unbalance Type

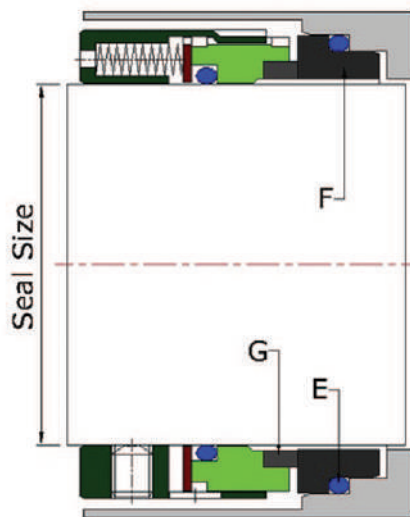
Dimension Data – INCH



A	B	C	L.W	L	D	SEAL CODE	SEAL CODE	SEAL CODE
		Min				Solid Carbon Rot.	Insert Carbon Rot.	Insert Si-C Rot.
1.000	1.575	1.733	1.122	0.250	021	RMS U 11-A4/1.0"-GSVHS	RMS U 11-A4/1.0"-2SVHS	RMS U 11-A4/1.0"-3SVHS
1.125	1.700	1.858	1.122	0.250	122	RMS U 11-A4/1.125"-GSVHS	RMS U 11-A4/1.125"-2SVHS	RMS U 11-A4/1.125"-3SVHS
1.250	1.850	2.008	1.250	0.275	124	RMS U 11-A4/1.25"-GSVHS	RMS U 11-A4/1.25"-2SVHS	RMS U 11-A4/1.25"-3SVHS
1.375	1.975	2.133	1.250	0.275	126	RMS U 11-A4/1.375"-GSVHS	RMS U 11-A4/1.375"-2SVHS	RMS U 11-A4/1.375"-3SVHS
1.500	2.100	2.258	1.250	0.275	128	RMS U 11-A4/1.50"-GSVHS	RMS U 11-A4/1.50"-2SVHS	RMS U 11-A4/1.50"-3SVHS
1.625	2.224	2.382	1.250	0.275	130	RMS U 11-A4/1.625"-GSVHS	RMS U 11-A4/1.625"-2SVHS	RMS U 11-A4/1.625"-3SVHS
1.750	2.350	2.508	1.250	0.275	132	RMS U 11-A4/1.75"-GSVHS	RMS U 11-A4/1.75"-2SVHS	RMS U 11-A4/1.75"-3SVHS
1.875	2.475	2.633	1.250	0.275	134	RMS U 11-A4/1.875"-GSVHS	RMS U 11-A4/1.875"-2SVHS	RMS U 11-A4/1.875"-3SVHS
2.000	2.558	2.716	1.300	0.295	136	RMS U 11-A4/2.0"-GSVHS	RMS U 11-A4/2.0"-2SVHS	RMS U 11-A4/2.0"-3SVHS
2.125	2.725	2.883	1.300	0.295	138	RMS U 11-A4/2.125"-GSVHS	RMS U 11-A4/2.125"-2SVHS	RMS U 11-A4/2.125"-3SVHS
2.250	3.076	3.234	1.476	0.315	140	RMS U 11-A4/2.25"-GSVHS	RMS U 11-A4/2.25"-2SVHS	RMS U 11-A4/2.25"-3SVHS
2.375	3.200	3.358	1.476	0.315	229	RMS U 11-A4/2.375"-GSVHS	RMS U 11-A4/2.375"-2SVHS	RMS U 11-A4/2.375"-3SVHS
2.500	3.260	3.418	1.476	0.315	230	RMS U 11-A4/2.50"-GSVHS	RMS U 11-A4/2.50"-2SVHS	RMS U 11-A4/2.50"-3SVHS
2.625	3.450	3.608	1.476	0.315	231	RMS U 11-A4/2.625"-GSVHS	RMS U 11-A4/2.625"-2SVHS	RMS U 11-A4/2.625"-3SVHS
2.750	3.575	3.733	1.654	0.394	232	RMS U 11-A4/2.75"-GSVHS	RMS U 11-A4/2.75"-2SVHS	RMS U 11-A4/2.75"-3SVHS
2.875	3.700	3.858	1.654	0.394	233	RMS U 11-A4/2.875"-GSVHS	RMS U 11-A4/2.875"-2SVHS	RMS U 11-A4/2.875"-3SVHS
3.000	3.826	3.984	1.654	0.394	234	RMS U 11-A4/3.0"-GSVHS	RMS U 11-A4/3.0"-2SVHS	RMS U 11-A4/3.0"-3SVHS
3.125	3.952	4.110	1.654	0.394	235	RMS U 11-A4/3.125"-GSVHS	RMS U 11-A4/3.125"-2SVHS	RMS U 11-A4/3.125"-3SVHS
3.250	4.075	4.233	1.654	0.394	236	RMS U 11-A4/3.25"-GSVHS	RMS U 11-A4/3.25"-2SVHS	RMS U 11-A4/3.25"-3SVHS
3.375	4.200	4.358	1.654	0.394	237	RMS U 11-A4/3.375"-GSVHS	RMS U 11-A4/3.375"-2SVHS	RMS U 11-A4/3.375"-3SVHS
3.500	4.406	4.564	1.850	0.394	341	RMS U 11-A4/3.50"-GSVHS	RMS U 11-A4/3.50"-2SVHS	RMS U 11-A4/3.50"-3SVHS
3.625	4.532	4.690	1.850	0.394	342	RMS U 11-A4/3.625"-GSVHS	RMS U 11-A4/3.625"-2SVHS	RMS U 11-A4/3.625"-3SVHS
3.750	4.656	4.814	1.850	0.394	343	RMS U 11-A4/3.75"-GSVHS	RMS U 11-A4/3.75"-2SVHS	RMS U 11-A4/3.75"-3SVHS
3.875	4.785	4.943	1.850	0.394	344	RMS U 11-A4/3.875"-GSVHS	RMS U 11-A4/3.875"-2SVHS	RMS U 11-A4/3.875"-3SVHS
4.000	4.906	5.064	1.850	0.394	345	RMS U 11-A4/4.0"-GSVHS	RMS U 11-A4/4.0"-2SVHS	RMS U 11-A4/4.0"-3SVHS
4.125	5.109	5.267	1.929	0.394	346	RMS U 11-A4/4.125"-GSVHS	RMS U 11-A4/4.125"-2SVHS	RMS U 11-A4/4.125"-3SVHS
4.250	5.232	5.390	1.929	0.394	347	RMS U 11-A4/4.25"-GSVHS	RMS U 11-A4/4.25"-2SVHS	RMS U 11-A4/4.25"-3SVHS
4.375	5.359	5.517	1.929	0.394	348	RMS U 11-A4/4.375"-GSVHS	RMS U 11-A4/4.375"-2SVHS	RMS U 11-A4/4.375"-3SVHS
4.500	5.484	5.642	1.929	0.394	349	RMS U 11-A4/4.50"-GSVHS	RMS U 11-A4/4.50"-2SVHS	RMS U 11-A4/4.50"-3SVHS
4.625	5.610	5.768	1.929	0.394	350	RMS U 11-A4/4.625"-GSVHS	RMS U 11-A4/4.625"-2SVHS	RMS U 11-A4/4.625"-3SVHS
4.750	5.732	5.890	1.929	0.394	351	RMS U 11-A4/4.75"-GSVHS	RMS U 11-A4/4.75"-2SVHS	RMS U 11-A4/4.75"-3SVHS
4.875	5.860	6.018	1.929	0.394	352	RMS U 11-A4/4.875"-GSVHS	RMS U 11-A4/4.875"-2SVHS	RMS U 11-A4/4.875"-3SVHS
5.000	5.984	6.142	1.929	0.394	353	RMS U 11-A4/5.0"-GSVHS	RMS U 11-A4/5.0"-2SVHS	RMS U 11-A4/5.0"-3SVHS

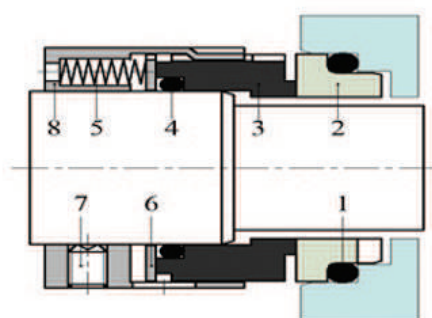
RMS U-11 - Unbalanced Rotary Multi Spring Unbalance Type

Dimensional Data – METRIC



A	B	C	L.W	L	D	SEAL CODE	SEAL CODE	SEAL CODE
		Min				Solid Carbon Rot.	Insert Carbon Rot.	Insert Si-C Rot.
25	40	44	28.5	6	25x2.5	RMS U 11-A4/025-GSVHS	RMS U 11-A4/025-2SVHS	RMS U 11-A4/025-3SVHS
28	43	47	31	7	122	RMS U 11-A4/028-GSVHS	RMS U 11-A4/028-2SVHS	RMS U 11-A4/028-3SVHS
30	45	49	31	7	123	RMS U 11-A4/030-GSVHS	RMS U 11-A4/030-2SVHS	RMS U 11-A4/030-3SVHS
32	47	51	31	7	124	RMS U 11-A4/032-GSVHS	RMS U 11-A4/032-2SVHS	RMS U 11-A4/032-3SVHS
33	48	52	31	7	125	RMS U 11-A4/033-GSVHS	RMS U 11-A4/033-2SVHS	RMS U 11-A4/033-3SVHS
35	50	54	31	7	126	RMS U 11-A4/035-GSVHS	RMS U 11-A4/035-2SVHS	RMS U 11-A4/035-3SVHS
38	55	59	31	7	128	RMS U 11-A4/038-GSVHS	RMS U 11-A4/038-2SVHS	RMS U 11-A4/038-3SVHS
40	57	61	31	7	129	RMS U 11-A4/040-GSVHS	RMS U 11-A4/040-2SVHS	RMS U 11-A4/040-3SVHS
43	60	64	31	7	131	RMS U 11-A4/043-GSVHS	RMS U 11-A4/043-2SVHS	RMS U 11-A4/043-3SVHS
45	62	66	31	7	132	RMS U 11-A4/045-GSVHS	RMS U 11-A4/045-2SVHS	RMS U 11-A4/045-3SVHS
48	65	69	31	7	134	RMS U 11-A4/048-GSVHS	RMS U 11-A4/048-2SVHS	RMS U 11-A4/048-3SVHS
50	67	71	32.5	8	50x3	RMS U 11-A4/050-GSVHS	RMS U 11-A4/050-2SVHS	RMS U 11-A4/050-3SVHS
53	70	74	32.5	8	53.1x3	RMS U 11-A4/053-GSVHS	RMS U 11-A4/053-2SVHS	RMS U 11-A4/053-3SVHS
55	72	76	32.5	8	55x3	RMS U 11-A4/055-GSVHS	RMS U 11-A4/055-2SVHS	RMS U 11-A4/055-3SVHS
58	79	83	37.5	8	58x3	RMS U 11-A4/058-GSVHS	RMS U 11-A4/058-2SVHS	RMS U 11-A4/058-3SVHS
60	81	85	37.5	8	229	RMS U 11-A4/060-GSVHS	RMS U 11-A4/060-2SVHS	RMS U 11-A4/060-3SVHS
63	84	88	37.5	8	230	RMS U 11-A4/063-GSVHS	RMS U 11-A4/063-2SVHS	RMS U 11-A4/063-3SVHS
65	86	90	37.5	8	65.09x3.53	RMS U 11-A4/065-GSVHS	RMS U 11-A4/065-2SVHS	RMS U 11-A4/065-3SVHS
68	89	93	37.5	8	68.26x3.53	RMS U 11-A4/068-GSVHS	RMS U 11-A4/068-2SVHS	RMS U 11-A4/068-3SVHS
70	91	95	42	10	232	RMS U 11-A4/070-GSVHS	RMS U 11-A4/070-2SVHS	RMS U 11-A4/070-3SVHS
75	99	103	42	10	75x4	RMS U 11-A4/075-GSVHS	RMS U 11-A4/075-2SVHS	RMS U 11-A4/075-3SVHS
80	104	108	42	10	80x4	RMS U 11-A4/080-GSVHS	RMS U 11-A4/080-2SVHS	RMS U 11-A4/080-3SVHS
85	109	113	42	10	85x4	RMS U 11-A4/085-GSVHS	RMS U 11-A4/085-2SVHS	RMS U 11-A4/085-3SVHS
90	114	118	47	10	90x4	RMS U 11-A4/090-GSVHS	RMS U 11-A4/090-2SVHS	RMS U 11-A4/090-3SVHS
95	119	123	47	10	240	RMS U 11-A4/095-GSVHS	RMS U 11-A4/095-2SVHS	RMS U 11-A4/095-3SVHS
100	124	128	47	10	100x4	RMS U 11-A4/100-GSVHS	RMS U 11-A4/100-2SVHS	RMS U 11-A4/100-3SVHS
105	138	142	49	10	243	RMS U 11-A4/105-GSVHS	RMS U 11-A4/105-2SVHS	RMS U 11-A4/105-3SVHS
110	143	147	49	10	110x4	RMS U 11-A4/110-GSVHS	RMS U 11-A4/110-2SVHS	RMS U 11-A4/110-3SVHS
115	148	152	49	10	115x5	RMS U 11-A4/115-GSVHS	RMS U 11-A4/115-2SVHS	RMS U 11-A4/115-3SVHS
120	153	157	49	10	120x5	RMS U 11-A4/120-GSVHS	RMS U 11-A4/120-2SVHS	RMS U 11-A4/120-3SVHS
125	158	162	49	10	125x5	RMS U 11-A4/125-GSVHS	RMS U 11-A4/125-2SVHS	RMS U 11-A4/125-3SVHS

RMS B-13 - Balanced Rotary Multi Springs



RMS B-13 Balanced Mechanical Seal.

Multi spring type, pusher type balanced seals suitable for high pressure and used for universal application used. The seals are compact in design suiting all types of rotating equipments, pump and mixers. Drive lugs in the retainer will provide torque transmission and reduce slippage on shaft and sleeve.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers PTFE Wedge [<i>Special Design</i>]

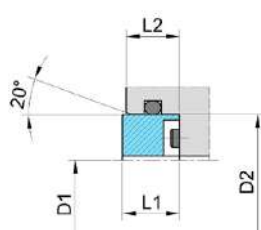
Seal Characteristic

- Single Seal
- Balanced Seal
- Independent of direction.

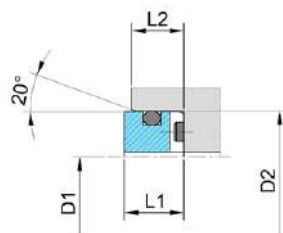
Applications

- General Chemicals.
- Petrochemicals.
- Refineries.
- Light hydrocarbons, water

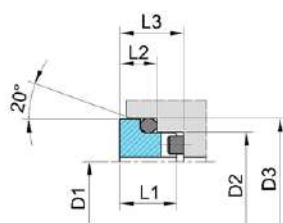
STATIONARY RINGS



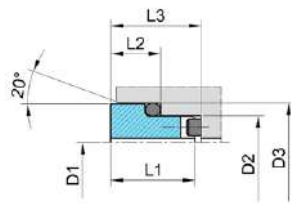
B0



B1



A4



A9

STATIONARY RINGS	
B1	B0
A4	A9

Components

1. Stationary Packing
2. Stationary Face
3. Rotary Face
4. Rotary Packing
5. Spring
6. Back Up Ring
7. Set Screw
8. Spring Holder

Performance Range

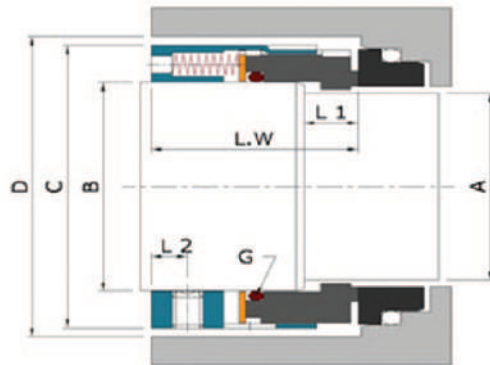
Shaft Diameter	25 – 120mm
Pressure	up to 35 bar [max]
Temperature	-20 ~ 240 °C
Velocity	20 m/sec

Note :

Special design, for pressure 80 ~ 100 bar, please contact sales for special design

RMS B-13 - Balanced Rotary Multi Springs

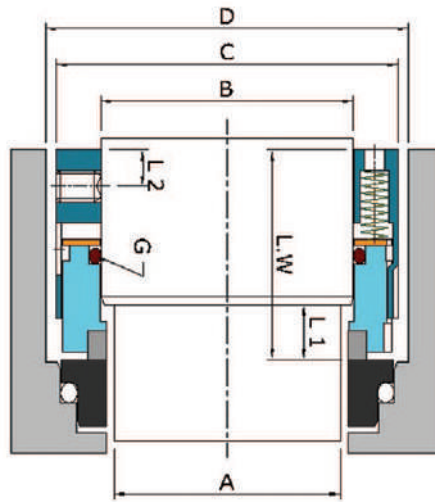
Dimensional Data – INCH



A	B	C	D	L.W	L.1	L.2	G	SEAL CODE	SEAL CODE	SEAL CODE
			Min					Solid Carbon Rot.	Insert Carbon Rot.	Insert Si-C Rot.
0.750	1.000	1.575	1.733	1.300	0.343	0.256	120	RMS B 13-A4/1.0"-GSVHS	RMS B 13-A4/1.0"-2SVHS	RMS B 13-A4/1.0"-3SVHS
0.875	1.125	1.700	1.858	1.420	0.343	0.256	122	RMS B 13-A4/1.125"-GSVHS	RMS B 13-A4/1.125"-2SVHS	RMS B 13-A4/1.125"-3SVHS
1.000	1.250	1.850	2.010	1.420	0.343	0.256	124	RMS B 13-A4/1.25"-GSVHS	RMS B 13-A4/1.25"-2SVHS	RMS B 13-A4/1.25"-3SVHS
1.125	1.375	1.975	2.133	1.500	0.343	0.300	126	RMS B 13-A4/1.375"-GSVHS	RMS B 13-A4/1.375"-2SVHS	RMS B 13-A4/1.375"-3SVHS
1.250	1.500	2.100	2.258	1.500	0.343	0.300	128	RMS B 13-A4/1.50"-GSVHS	RMS B 13-A4/1.50"-2SVHS	RMS B 13-A4/1.50"-3SVHS
1.375	1.625	2.224	2.400	1.500	0.433	0.300	130	RMS B 13-A4/1.625"-GSVHS	RMS B 13-A4/1.625"-2SVHS	RMS B 13-A4/1.625"-3SVHS
1.500	1.750	2.350	2.500	1.500	0.433	0.300	132	RMS B 13-A4/1.75"-GSVHS	RMS B 13-A4/1.75"-2SVHS	RMS B 13-A4/1.75"-3SVHS
1.625	1.875	2.475	2.633	1.500	0.433	0.300	134	RMS B 13-A4/1.875"-GSVHS	RMS B 13-A4/1.875"-2SVHS	RMS B 13-A4/1.875"-3SVHS
1.750	2.000	2.598	2.756	1.500	0.433	0.300	136	RMS B 13-A4/2.0"-GSVHS	RMS B 13-A4/2.0"-2SVHS	RMS B 13-A4/2.0"-3SVHS
1.875	2.125	2.725	3.000	1.500	0.433	0.300	138	RMS B 13-A4/2.125"-GSVHS	RMS B 13-A4/2.125"-2SVHS	RMS B 13-A4/2.125"-3SVHS
2.000	2.250	3.076	3.234	1.670	0.433	0.315	140	RMS B 13-A4/2.25"-GSVHS	RMS B 13-A4/2.25"-2SVHS	RMS B 13-A4/2.25"-3SVHS
2.125	2.375	3.200	3.358	1.670	0.433	0.315	229	RMS B 13-A4/2.375"-GSVHS	RMS B 13-A4/2.375"-2SVHS	RMS B 13-A4/2.375"-3SVHS
2.250	2.500	3.260	3.420	1.870	0.433	0.315	230	RMS B 13-A4/2.50"-GSVHS	RMS B 13-A4/2.50"-2SVHS	RMS B 13-A4/2.50"-3SVHS
2.375	2.625	3.450	3.610	1.870	0.433	0.315	231	RMS B 13-A4/2.625"-GSVHS	RMS B 13-A4/2.625"-2SVHS	RMS B 13-A4/2.625"-3SVHS
2.500	2.750	3.575	3.733	1.870	0.500	0.315	232	RMS B 13-A4/2.75"-GSVHS	RMS B 13-A4/2.75"-2SVHS	RMS B 13-A4/2.75"-3SVHS
2.625	2.875	3.700	3.860	2.050	0.500	0.343	233	RMS B 13-A4/2.875"-GSVHS	RMS B 13-A4/2.875"-2SVHS	RMS B 13-A4/2.875"-3SVHS
2.750	3.000	3.826	3.984	2.050	0.500	0.343	234	RMS B 13-A4/3.0"-GSVHS	RMS B 13-A4/3.0"-2SVHS	RMS B 13-A4/3.0"-3SVHS
2.875	3.125	3.952	4.110	2.050	0.500	0.343	235	RMS B 13-A4/3.125"-GSVHS	RMS B 13-A4/3.125"-2SVHS	RMS B 13-A4/3.125"-3SVHS
3.000	3.250	4.075	4.233	2.050	0.500	0.343	236	RMS B 13-A4/3.25"-GSVHS	RMS B 13-A4/3.25"-2SVHS	RMS B 13-A4/3.25"-3SVHS
3.125	3.375	4.200	4.358	2.050	0.500	0.343	237	RMS B 13-A4/3.375"-GSVHS	RMS B 13-A4/3.375"-2SVHS	RMS B 13-A4/3.375"-3SVHS
3.250	3.500	4.405	4.563	2.235	0.500	0.433	238	RMS B 13-A4/3.50"-GSVHS	RMS B 13-A4/3.50"-2SVHS	RMS B 13-A4/3.50"-3SVHS
3.375	3.625	4.530	4.688	2.235	0.500	0.433	239	RMS B 13-A4/3.625"-GSVHS	RMS B 13-A4/3.625"-2SVHS	RMS B 13-A4/3.625"-3SVHS
3.500	3.750	4.650	4.810	2.235	0.500	0.433	240	RMS B 13-A4/3.75"-GSVHS	RMS B 13-A4/3.75"-2SVHS	RMS B 13-A4/3.75"-3SVHS
3.625	3.875	4.780	4.940	2.275	0.500	0.433	241	RMS B 13-A4/3.875"-GSVHS	RMS B 13-A4/3.875"-2SVHS	RMS B 13-A4/3.875"-3SVHS
3.750	4.000	4.900	5.060	2.275	0.500	0.433	242	RMS B 13-A4/4.0"-GSVHS	RMS B 13-A4/4.0"-2SVHS	RMS B 13-A4/4.0"-3SVHS
3.875	4.125	5.120	5.278	2.275	0.500	0.433	346	RMS B 13-A4/4.125"-GSVHS	RMS B 13-A4/4.125"-2SVHS	RMS B 13-A4/4.125"-3SVHS
4.000	4.250	5.230	5.388	2.275	0.500	0.433	347	RMS B 13-A4/4.25"-GSVHS	RMS B 13-A4/4.25"-2SVHS	RMS B 13-A4/4.25"-3SVHS
4.125	4.375	5.358	5.516	2.275	0.500	0.433	348	RMS B 13-A4/4.375"-GSVHS	RMS B 13-A4/4.375"-2SVHS	RMS B 13-A4/4.375"-3SVHS
4.250	4.500	5.480	5.640	2.275	0.500	0.433	349	RMS B 13-A4/4.50"-GSVHS	RMS B 13-A4/4.50"-2SVHS	RMS B 13-A4/4.50"-3SVHS
4.375	4.625	5.600	5.758	2.275	0.500	0.433	350	RMS B 13-A4/4.625"-GSVHS	RMS B 13-A4/4.625"-2SVHS	RMS B 13-A4/4.625"-3SVHS
4.500	4.750	5.730	5.890	2.275	0.500	0.433	351	RMS B 13-A4/4.75"-GSVHS	RMS B 13-A4/4.75"-2SVHS	RMS B 13-A4/4.75"-3SVHS
4.625	4.875	5.860	6.018	2.275	0.500	0.433	352	RMS B 13-A4/4.875"-GSVHS	RMS B 13-A4/4.875"-2SVHS	RMS B 13-A4/4.875"-3SVHS
4.750	5.000	5.980	6.140	2.275	0.500	0.433	353	RMS B 13-A4/5.0"-GSVHS	RMS B 13-A4/5.0"-2SVHS	RMS B 13-A4/5.0"-3SVHS

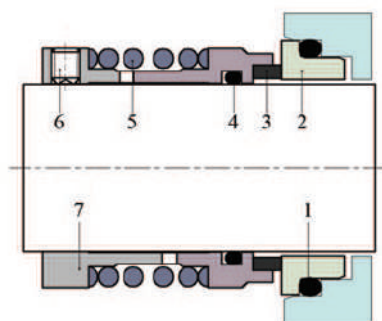
RMS B-13 - Balanced Rotary Multi Springs

Dimensional Data – METRIC

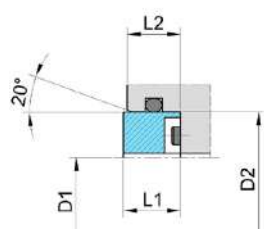


A	B	C	D Min	L.W	L.1	L.2	G	SEAL CODE	SEAL CODE	SEAL CODE
								Solid Carbon Rot.	Insert Carbon Rot.	Insert Si-C Rot.
20	24	38	40	33	8.5	4	019	RMS B 13-A4/024-GSVHS	RMS B 13-A4/024-2SVHS	RMS B 13-A4/024-2SVHS
22	26	40	44	33	8.5	5	120	RMS B 13-A4/026-GSVHS	RMS B 13-A4/026-2SVHS	RMS B 13-A4/026-2SVHS
24	28	43	47	36.0	8.5	6.5	122	RMS B 13-A4/028-GSVHS	RMS B 13-A4/028-2SVHS	RMS B 13-A4/028-3SVHS
25	30	45	49	36.0	8.5	6.5	123	RMS B 13-A4/030-GSVHS	RMS B 13-A4/030-2SVHS	RMS B 13-A4/030-3SVHS
28	33	48	52	38.5	8.5	6.5	125	RMS B 13-A4/033-GSVHS	RMS B 13-A4/033-2SVHS	RMS B 13-A4/033-3SVHS
30	35	50	54	38.5	8.5	6.5	126	RMS B 13-A4/035-GSVHS	RMS B 13-A4/035-2SVHS	RMS B 13-A4/035-3SVHS
32	38	55	59	38.5	8.5	7.5	128	RMS B 13-A4/038-GSVHS	RMS B 13-A4/038-2SVHS	RMS B 13-A4/038-3SVHS
33	38	55	59	38.5	8.5	7.5	128	RMS B 13-A4/038-GSVHS	RMS B 13-A4/038-2SVHS	RMS B 13-A4/038-3SVHS
35	40	57	61	38.5	8.5	7.5	129	RMS B 13-A4/040-GSVHS	RMS B 13-A4/040-2SVHS	RMS B 13-A4/040-3SVHS
38	43	60	64	38.5	9	7.5	131	RMS B 13-A4/043-GSVHS	RMS B 13-A4/043-2SVHS	RMS B 13-A4/043-3SVHS
40	45	62	66	38.5	9	7.5	132	RMS B 13-A4/045-GSVHS	RMS B 13-A4/045-2SVHS	RMS B 13-A4/045-3SVHS
43	48	65	69	38.5	9	7.5	134	RMS B 13-A4/048-GSVHS	RMS B 13-A4/048-2SVHS	RMS B 13-A4/048-3SVHS
45	50	67	71	38.5	9	7.5	50x3	RMS B 13-A4/050-GSVHS	RMS B 13-A4/050-2SVHS	RMS B 13-A4/050-3SVHS
48	53	70	74	38.5	9	7.5	53.1x3	RMS B 13-A4/053-GSVHS	RMS B 13-A4/053-2SVHS	RMS B 13-A4/053-3SVHS
50	55	72	76	42.5	10	7.5	55x3	RMS B 13-A4/055-GSVHS	RMS B 13-A4/055-2SVHS	RMS B 13-A4/055-3SVHS
53	58	79	83	42.5	10	8	58x3	RMS B 13-A4/058-GSVHS	RMS B 13-A4/058-2SVHS	RMS B 13-A4/058-3SVHS
55	60	81	85	42.5	10	8	142	RMS B 13-A4/060-GSVHS	RMS B 13-A4/060-2SVHS	RMS B 13-A4/060-3SVHS
58	63	84	88	47.5	10	8	63x3	RMS B 13-A4/063-GSVHS	RMS B 13-A4/063-2SVHS	RMS B 13-A4/063-3SVHS
60	65	86	90	47.5	10	8	65x3	RMS B 13-A4/065-GSVHS	RMS B 13-A4/065-2SVHS	RMS B 13-A4/065-3SVHS
63	68	89	93	47.5	10	8.5	147	RMS B 13-A4/068-GSVHS	RMS B 13-A4/068-2SVHS	RMS B 13-A4/068-3SVHS
65	70	91	95	47.5	10	8.5	148	RMS B 13-A4/070-GSVHS	RMS B 13-A4/070-2SVHS	RMS B 13-A4/070-3SVHS
70	75	99	103	52.0	11	9	232	RMS B 13-A4/075-GSVHS	RMS B 13-A4/075-2SVHS	RMS B 13-A4/075-3SVHS
75	80	104	108	52.0	11	9	235	RMS B 13-A4/080-GSVHS	RMS B 13-A4/080-2SVHS	RMS B 13-A4/080-3SVHS
80	85	109	113	52.0	11	9	237	RMS B 13-A4/085-GSVHS	RMS B 13-A4/085-2SVHS	RMS B 13-A4/085-3SVHS
85	90	114	118	52.0	11	10	90x4	RMS B 13-A4/090-GSVHS	RMS B 13-A4/090-2SVHS	RMS B 13-A4/090-3SVHS
90	95	119	123	56.8	11	10	240	RMS B 13-A4/095-GSVHS	RMS B 13-A4/095-2SVHS	RMS B 13-A4/095-3SVHS
95	100	124	128	57.8	11	10	100x4	RMS B 13-A4/100-GSVHS	RMS B 13-A4/100-2SVHS	RMS B 13-A4/100-3SVHS
100	105	129	133	57.8	11	10	243	RMS B 13-A4/105-GSVHS	RMS B 13-A4/105-2SVHS	RMS B 13-A4/105-3SVHS
105	110	143	147	57.8	11	10	110x4	RMS B 13-A4/110-GSVHS	RMS B 13-A4/110-2SVHS	RMS B 13-A4/110-3SVHS
110	115	146	152	57.8	11	10	115x5	RMS B 13-A4/115-GSVHS	RMS B 13-A4/115-2SVHS	RMS B 13-A4/115-3SVHS
115	120	153	157	57.8	11	10	120x5	RMS B 13-A4/120-GSVHS	RMS B 13-A4/120-2SVHS	RMS B 13-A4/120-3SVHS
120	125	158	162	57.8	11	10	125x5	RMS B 13-A4/125-GSVHS	RMS B 13-A4/125-2SVHS	RMS B 13-A4/125-3SVHS
125	130	163	167	57.8	11	10	354	RMS B 13-A4/5.0"-GSVHS	RMS B 13-A4/5.0"-2SVHS	RMS B 13-A4/5.0"-3SVHS

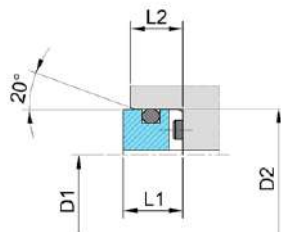
RSS U-11 - Unbalanced Rotary Single Spring



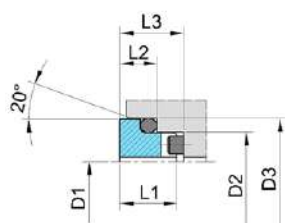
STATIONARY RINGS



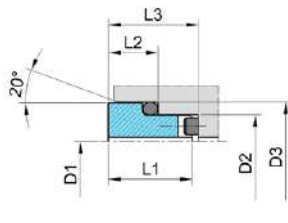
B0



B1



A4



A9

STATIONARY RINGS	
B1	B0
A4	A9

RSS U-11. Unbalanced Mechanical Seal.

Single coil spring type, unbalanced seals developed for light contamination, dirty media and clogging type application. The mechanical drive of this seal is realised by grub screw which lock onto the shaft. Seal is not dependent on direction of shaft rotation.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers PTFE Wedge (<i>Special Design</i>)

Seal Characteristic

- Single Seal.
- Single Coil Spring
- Unbalanced Seal
- Independent of direction of rotation

Applications

- General Chemicals.
- Petrochemicals.
- Light hydrocarbons.

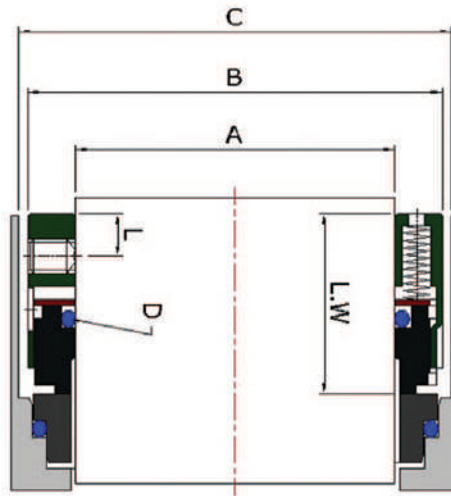
Components

1. Stationary Packing
2. Stationary Face
3. Rotary Face
4. Rotary Packing
5. Spring
6. Set Screw
7. Collar Spring

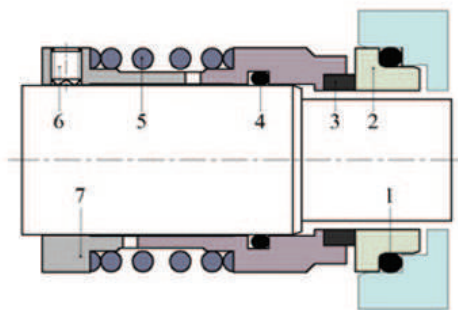
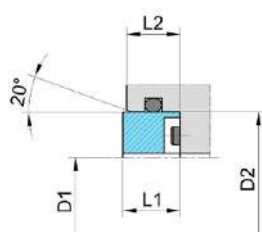
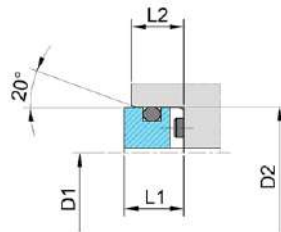
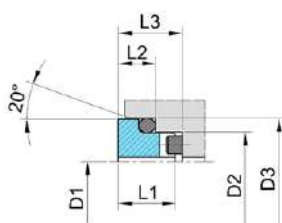
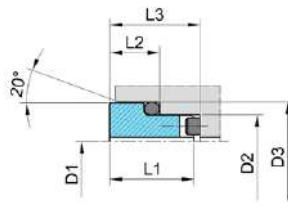
Performance Range

Shaft Diameter	25 – 120mm
Pressure	10 bar [max]
Temperature	-20 ~ 240 °C
Velocity	15 m/sec

RSS U-11 - Unbalanced Rotary Single Spring Basic Seal



DASH	d1	d2	d3	d4	A	B	L	Seal Code	Seal Code
16	1"	1.388"	1.622"	1.496"	0.437"	0.272"	1.653"	RSS U 11-A4/1.000"-2SVSS	RSS U 11-A4/1.000"-3SVSS
18	1.125"	1.5"	1.748"	1.634"	0.437"	0.272"	1.653"	RSS U 11-A4/1.125"-2SVSS	RSS U 11-A4/1.125"-3SVSS
20	1.25"	1.638"	1.872"	1.756"	0.437"	0.272"	1.653"	RSS U 11-A4/1.250"-2SVSS	RSS U 11-A4/1.250"-3SVSS
22	1.375"	1.762"	1.988"	1.882"	0.437"	0.272"	1.653"	RSS U 11-A4/1.375"-2SVSS	RSS U 11-A4/1.375"-3SVSS
24	1.5"	1.878"	2.113"	2.007"	0.437"	0.272"	1.654"	RSS U 11-A4/1.500"-2SVSS	RSS U 11-A4/1.500"-3SVSS
26	1.625"	2.138"	2.374"	2.126"	0.5"	0.327"	1.772"	RSS U 11-A4/1.625"-2SVSS	RSS U 11-A4/1.625"-3SVSS
28	1.75"	2.262"	2.5"	2.252"	0.5"	0.327"	1.772"	RSS U 11-A4/1.750"-2SVSS	RSS U 11-A4/1.750"-3SVSS
30	1.875"	2.388"	2.624"	2.503"	0.5"	0.327"	2.047"	RSS U 11-A4/1.875"-2SVSS	RSS U 11-A4/1.875"-3SVSS
32	2"	2.512"	2.748"	2.63"	0.5"	0.325"	2.047"	RSS U 11-A4/2.000"-2SVSS	RSS U 11-A4/2.000"-3SVSS
34	2.125"	2.762"	2.994"	2.755"	0.563"	0.358"	2.126"	RSS U 11-A4/2.125"-2SVSS	RSS U 11-A4/2.125"-3SVSS
36	2.25"	2.888"	3.117"	2.881"	0.563"	0.358"	2.126"	RSS U 11-A4/2.250"-2SVSS	RSS U 11-A4/2.250"-3SVSS
38	2.375"	3.012"	3.244"	3.084"	0.563"	0.359"	2.244"	RSS U 11-A4/2.375"-2SVSS	RSS U 11-A4/2.375"-3SVSS
40	2.5"	3.138"	3.368"	3.212"	0.563"	0.359"	2.244"	RSS U 11-A4/2.500"-2SVSS	RSS U 11-A4/2.500"-3SVSS
42	2.625"	3.138"	3.368"	3.334"	0.626"	0.39"	2.362"	RSS U 11-A4/2.625"-2SVSS	RSS U 11-A4/2.625"-3SVSS
44	2.75"	3.262"	3.494"	3.464"	0.626"	0.39"	2.362"	RSS U 11-A4/2.750"-2SVSS	RSS U 11-A4/2.750"-3SVSS
46	2.875"	3.382"	3.744"	3.669"	0.626"	0.468"	2.48"	RSS U 11-A4/2.875"-2SVSS	RSS U 11-A4/2.875"-3SVSS
48	3"	3.504"	3.87"	3.803"	0.626"	0.468"	2.598"	RSS U 11-A4/3.000"-2SVSS	RSS U 11-A4/3.000"-3SVSS
50	3.125"	3.63"	3.994"	3.937"	0.626"	0.468"	2.598"	RSS U 11-A4/3.125"-2SVSS	RSS U 11-A4/3.125"-3SVSS
52	3.25"	3.756"	4.118"	4.063"	0.626"	0.468"	2.598"	RSS U 11-A4/3.250"-2SVSS	RSS U 11-A4/3.250"-3SVSS
54	3.375"	3.882"	4.244"	4.189"	0.626"	0.468"	2.717"	RSS U 11-A4/3.375"-2SVSS	RSS U 11-A4/3.375"-3SVSS
56	3.5"	4.004"	4.358"	4.315"	0.626"	0.468"	2.717"	RSS U 11-A4/3.500"-2SVSS	RSS U 11-A4/3.500"-3SVSS
58	3.625"	4.13"	4.494"	4.441"	0.689"	0.512"	2.835"	RSS U 11-A4/3.625"-2SVSS	RSS U 11-A4/3.625"-3SVSS
60	3.75"	4.256"	4.618"	4.567"	0.689"	0.512"	2.835"	RSS U 11-A4/3.750"-2SVSS	RSS U 11-A4/3.750"-3SVSS
62	3.875"	4.38"	4.744"	4.693"	0.689"	0.512"	2.835"	RSS U 11-A4/3.875"-2SVSS	RSS U 11-A4/3.875"-3SVSS
64	4"	4.506"	4.868"	4.819"	0.689"	0.512"	2.953"	RSS U 11-A4/4.000"-2SVSS	RSS U 11-A4/4.000"-3SVSS
66	4.125"	4.627"	4.997"	5.039"	0.689"	0.512"	3.228"	RSS U 11-A4/4.125"-2SVSS	RSS U 11-A4/4.125"-3SVSS
68	4.25"	4.756"	5.116"	5.165"	0.689"	0.512"	3.228"	RSS U 11-A4/4.250"-2SVSS	RSS U 11-A4/4.250"-3SVSS
70	4.375"	4.877"	5.247"	5.292"	0.689"	0.512"	3.228"	RSS U 11-A4/4.375"-2SVSS	RSS U 11-A4/4.375"-3SVSS
72	4.5"	5.006"	5.366"	5.417"	0.689"	0.512"	3.228"	RSS U 11-A4/4.500"-2SVSS	RSS U 11-A4/4.500"-3SVSS
74	4.625"	5.127"	5.497"	5.59"	0.689"	0.512"	3.346"	RSS U 11-A4/4.625"-2SVSS	RSS U 11-A4/4.625"-3SVSS
76	4.75"	5.256"	5.626"	5.716"	0.689"	0.512"	3.346"	RSS U 11-A4/4.750"-2SVSS	RSS U 11-A4/4.750"-3SVSS
78	4.875"	5.377"	5.747"	5.843"	0.689"	0.512"	3.346"	RSS U 11-A4/4.875"-2SVSS	RSS U 11-A4/4.875"-3SVSS
80	5"	5.63"	6"	5.972"	0.689"	0.512"	3.622"	RSS U 11-A4/5.000"-2SVSS	RSS U 11-A4/5.000"-3SVSS

RSS B-13 - Balanced Rotary Single Spring**STATIONARY RINGS****B0****B1****A4****A9**

STATIONARY RINGS	
B1	B0
A4	A9

RMS B-13. Balanced Mechanical Seal.

Single coil spring type, balanced seals developed suitable for high pressure and for light contamination, dirty media and clogging type application. The mechanical drive of this seal is realised by grub screw which lock onto the shaft. Seal is not dependent on direction of shaft rotation.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers PTFE Wedge [<i>Special Design</i>]

Seal Characteristic

- Single Seal.
- Single Coil Spring
- Balanced Seal
- Independent of direction of rotation

Applications

- General Chemicals.
- Petrochemicals.
- Light hydrocarbons

Components

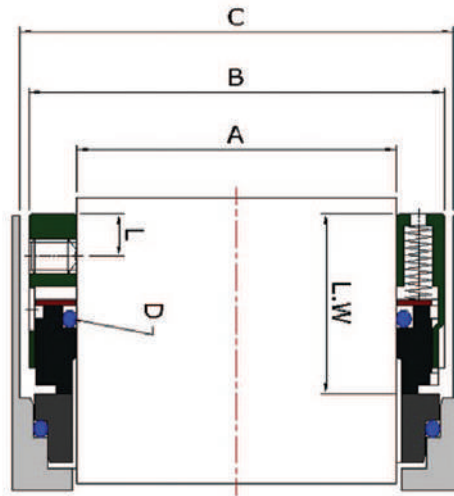
1. Stationary Packing
2. Stationary Face
3. Rotary Face
4. Rotary Packing
5. Spring
6. Set Screw
7. Collar Spring

Performance Range

Shaft Diameter	25 – 120mm
Pressure	Up to 35 bar [max]
Temperature	-20 ~ 240 °C
Velocity	15 m/sec

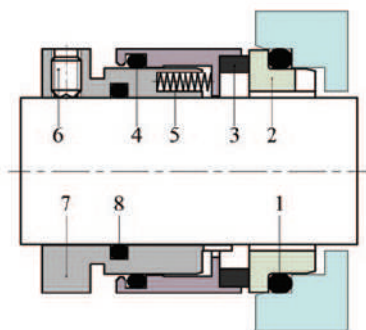
RSS-B 13 - Rotary Single Spring Balance

Dimension Data – METRIC



DASH	d1	d2	d3	d4	A	B	L	Seal Code	Seal Code
16	1"	1.388"	1.622"	1.496"	0.437"	0.272"	1.653"	RSS U 11-A4/1.000"-2SVSS	RSS U 11-A4/1.000"-3SVSS
18	1.125"	1.5"	1.748"	1.634"	0.437"	0.272"	1.653"	RSS U 11-A4/1.125"-2SVSS	RSS U 11-A4/1.125"-3SVSS
20	1.25"	1.638"	1.872"	1.756"	0.437"	0.272"	1.653"	RSS U 11-A4/1.250"-2SVSS	RSS U 11-A4/1.250"-3SVSS
22	1.375"	1.762"	1.988"	1.882"	0.437"	0.272"	1.653"	RSS U 11-A4/1.375"-2SVSS	RSS U 11-A4/1.375"-3SVSS
24	1.5"	1.878"	2.113"	2.007"	0.437"	0.272"	1.654"	RSS U 11-A4/1.500"-2SVSS	RSS U 11-A4/1.500"-3SVSS
26	1.625"	2.138"	2.374"	2.126"	0.5"	0.327"	1.772"	RSS U 11-A4/1.625"-2SVSS	RSS U 11-A4/1.625"-3SVSS
28	1.75"	2.262"	2.5"	2.252"	0.5"	0.327"	1.772"	RSS U 11-A4/1.750"-2SVSS	RSS U 11-A4/1.750"-3SVSS
30	1.875"	2.388"	2.624"	2.503"	0.5"	0.327"	2.047"	RSS U 11-A4/1.875"-2SVSS	RSS U 11-A4/1.875"-3SVSS
32	2"	2.512"	2.748"	2.63"	0.5"	0.325"	2.047"	RSS U 11-A4/2.000"-2SVSS	RSS U 11-A4/2.000"-3SVSS
34	2.125"	2.762"	2.994"	2.755"	0.563"	0.358"	2.126"	RSS U 11-A4/2.125"-2SVSS	RSS U 11-A4/2.125"-3SVSS
36	2.25"	2.888"	3.117"	2.881"	0.563"	0.358"	2.126"	RSS U 11-A4/2.250"-2SVSS	RSS U 11-A4/2.250"-3SVSS
38	2.375"	3.012"	3.244"	3.084"	0.563"	0.359"	2.244"	RSS U 11-A4/2.375"-2SVSS	RSS U 11-A4/2.375"-3SVSS
40	2.5"	3.138"	3.368"	3.212"	0.563"	0.359"	2.244"	RSS U 11-A4/2.500"-2SVSS	RSS U 11-A4/2.500"-3SVSS
42	2.625"	3.138"	3.368"	3.334"	0.626"	0.39"	2.362"	RSS U 11-A4/2.625"-2SVSS	RSS U 11-A4/2.625"-3SVSS
44	2.75"	3.262"	3.494"	3.464"	0.626"	0.39"	2.362"	RSS U 11-A4/2.750"-2SVSS	RSS U 11-A4/2.750"-3SVSS
46	2.875"	3.382"	3.744"	3.669"	0.626"	0.468"	2.48"	RSS U 11-A4/2.875"-2SVSS	RSS U 11-A4/2.875"-3SVSS
48	3"	3.504"	3.87"	3.803"	0.626"	0.468"	2.598"	RSS U 11-A4/3.000"-2SVSS	RSS U 11-A4/3.000"-3SVSS
50	3.125"	3.63"	3.994"	3.937"	0.626"	0.468"	2.598"	RSS U 11-A4/3.125"-2SVSS	RSS U 11-A4/3.125"-3SVSS
52	3.25"	3.756"	4.118"	4.063"	0.626"	0.468"	2.598"	RSS U 11-A4/3.250"-2SVSS	RSS U 11-A4/3.250"-3SVSS
54	3.375"	3.882"	4.244"	4.189"	0.626"	0.468"	2.717"	RSS U 11-A4/3.375"-2SVSS	RSS U 11-A4/3.375"-3SVSS
56	3.5"	4.004"	4.358"	4.315"	0.626"	0.468"	2.717"	RSS U 11-A4/3.500"-2SVSS	RSS U 11-A4/3.500"-3SVSS
58	3.625"	4.13"	4.494"	4.441"	0.689"	0.512"	2.835"	RSS U 11-A4/3.625"-2SVSS	RSS U 11-A4/3.625"-3SVSS
60	3.75"	4.256"	4.618"	4.567"	0.689"	0.512"	2.835"	RSS U 11-A4/3.750"-2SVSS	RSS U 11-A4/3.750"-3SVSS
62	3.875"	4.38"	4.744"	4.693"	0.689"	0.512"	2.835"	RSS U 11-A4/3.875"-2SVSS	RSS U 11-A4/3.875"-3SVSS
64	4"	4.506"	4.868"	4.819"	0.689"	0.512"	2.953"	RSS U 11-A4/4.000"-2SVSS	RSS U 11-A4/4.000"-3SVSS
66	4.125"	4.627"	4.997"	5.039"	0.689"	0.512"	3.228"	RSS U 11-A4/4.125"-2SVSS	RSS U 11-A4/4.125"-3SVSS
68	4.25"	4.756"	5.116"	5.165"	0.689"	0.512"	3.228"	RSS U 11-A4/4.250"-2SVSS	RSS U 11-A4/4.250"-3SVSS
70	4.375"	4.877"	5.247"	5.292"	0.689"	0.512"	3.228"	RSS U 11-A4/4.375"-2SVSS	RSS U 11-A4/4.375"-3SVSS
72	4.5"	5.006"	5.366"	5.417"	0.689"	0.512"	3.228"	RSS U 11-A4/4.500"-2SVSS	RSS U 11-A4/4.500"-3SVSS
74	4.625"	5.127"	5.497"	5.59"	0.689"	0.512"	3.346"	RSS U 11-A4/4.625"-2SVSS	RSS U 11-A4/4.625"-3SVSS
76	4.75"	5.256"	5.626"	5.716"	0.689"	0.512"	3.346"	RSS U 11-A4/4.750"-2SVSS	RSS U 11-A4/4.750"-3SVSS
78	4.875"	5.377"	5.747"	5.843"	0.689"	0.512"	3.346"	RSS U 11-A4/4.875"-2SVSS	RSS U 11-A4/4.875"-3SVSS
80	5"	5.63"	6"	5.972"	0.689"	0.512"	3.622"	RSS U 11-A4/5.000"-2SVSS	RSS U 11-A4/5.000"-3SVSS

RMS B-16 - Balanced Rotary Multi Springs



RMS- B16. Balanced Mechanical Seal.

Multi spring type, balanced seals without need for step sleeve. This seals are designed for media containing solids or with high viscosity. The springs are protected from media, thus no clogging of springs or springs compartment, resulting in high reliability.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers

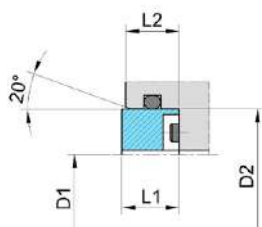
Seal Characteristic

- Single Seal.
- Capsulated Spring
- Balanced Seal
- Independent of direction of rotation

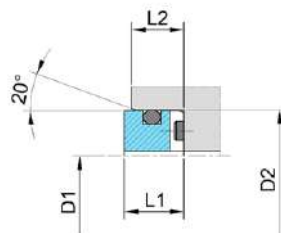
Applications

- General Chemicals.
- Food Industries
- Media Containing Solids

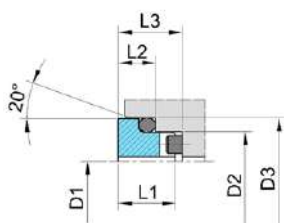
STATIONARY RINGS



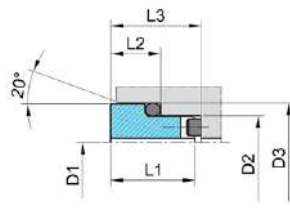
B0



B1



A4



A9

STATIONARY RINGS	
B1	B0
A4	A9

Components

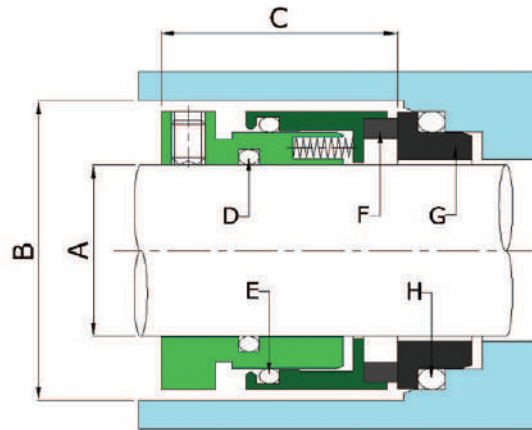
1. Stationary Packing
2. Stationary Face
3. Rotary Face
4. Rotary Packing
5. Spring
6. Set Screw
7. Collar Spring
8. Collar Packing

Performance Range

Shaft Diameter	25 – 120mm
Pressure	25 bar [max]
Temperature	-20 ~ 220 °C
Velocity	20 m/sec

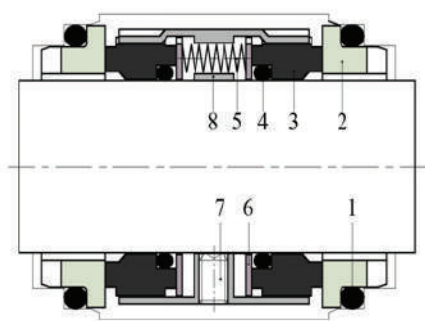
RMS B-16 - Balanced Rotary Multi Springs

Dimensional Data – INCH



Shaft Size A	B	C	D	E	F	G	H	SEAL CODE	SEAL CODE
					Ring	Cushion		INSERT CARBON ROT	INSERT Si-C ROT
1.000	1.625	1.375	120	126	X 18 R2	X 18	222	RMS B16-A4/1.000"-2SVHS	RMS B16-A4/1.000"-3SVHS
1.125	1.698	1.375	122	128	X 20 R2	X 20	223	RMS B16-A4/1.125"-2SVHS	RMS B16-A4/1.125"-3SVHS
1.250	1.823	1.750	124	130	X 22 R2	X 22	224	RMS B16-A4/1.250"-2SVHS	RMS B16-A4/1.250"-3SVHS
1.375	1.948	1.750	126	132	X 24 R2	X 24	225	RMS B16-A4/1.375"-2SVHS	RMS B16-A4/1.375"-3SVHS
1.500	2.143	1.750	128	134	X 26 R2	X 26	227	RMS B16-A4/1.500"-2SVHS	RMS B16-A4/1.500"-3SVHS
1.625	2.268	1.750	130	136	X 28 R2	X 28	228	RMS B16-A4/1.625"-2SVHS	RMS B16-A4/1.625"-3SVHS
1.750	2.393	1.750	132	138	X 30 R2	X 30	229	RMS B16-A4/1.750"-2SVHS	RMS B16-A4/1.750"-3SVHS
1.875	2.530	1.750	134	140	X 32 R2	X 32	230	RMS B16-A4/1.875"-2SVHS	RMS B16-A4/1.875"-3SVHS
2.000	2.724	1.750	136	142	X 34 R1	X 34	232	RMS B16-A4/2.000"-2SVHS	RMS B16-A4/2.000"-3SVHS
2.125	2.768	1.750	138	144	X 36 R1	X 36	233	RMS B16-A4/2.125"-2SVHS	RMS B16-A4/2.125"-3SVHS
2.250	2.975	1.750	140	147	X 38 R1	X 38	234	RMS B16-A4/2.250"-2SVHS	RMS B16-A4/2.250"-3SVHS
2.375	3.018	1.750	142	149	X 40 R2	X 40	235	RMS B16-A4/2.375"-2SVHS	RMS B16-A4/2.375"-3SVHS
2.500	3.255	1.750	144	151	X 42 R1	X 42	235	RMS B16-A4/2.500"-2SVHS	RMS B16-A4/2.500"-3SVHS
2.625	3.268	1.750	146	79.5x3	X 44 R1	X 44	236	RMS B16-A4/2.625"-2SVHS	RMS B16-A4/2.625"-3SVHS
2.750	3.535	2.000	148	152	X 46 R1	X 46	340	RMS B16-A4/2.750"-2SVHS	RMS B16-A4/2.750"-3SVHS
2.875	3.750	2.000	150	237	X 48 R1	X 48	341	RMS B16-A4/2.875"-2SVHS	RMS B16-A4/2.875"-3SVHS
3.000	3.875	2.000	234	238	X 50 R1	X 50	342	RMS B16-A4/3.000"-2SVHS	RMS B16-A4/3.000"-3SVHS
3.125	4.000	2.000	235	239	X 54 R2	X 52	343	RMS B16-A4/3.125"-2SVHS	RMS B16-A4/3.125"-3SVHS
3.250	4.125	2.000	236	240	X 56 R2	X 54	344	RMS B16-A4/3.250"-2SVHS	RMS B16-A4/3.250"-3SVHS
3.375	4.250	2.000	237	241	X 60 R2	X 58	346	RMS B16-A4/3.375"-2SVHS	RMS B16-A4/3.375"-3SVHS
3.500	4.375	2.000	238	242	X 62 R2	X 58	346	RMS B16-A4/3.500"-2SVHS	RMS B16-A4/3.500"-3SVHS
3.625	4.500	2.000	239	243	X 62 R2	X 60	347	RMS B16-A4/3.625"-2SVHS	RMS B16-A4/3.625"-3SVHS
3.750	4.625	2.000	240	244	X 64 R1	X 62	348	RMS B16-A4/3.75"-2SVHS	RMS B16-A4/3.75"-3SVHS
3.875	4.750	2.000	241	245	X 66 R1	X 64	349	RMS B16-A4/3.875"-2SVHS	RMS B16-A4/3.875"-3SVHS
4.000	4.875	2.000	242	246	X 68 R2	X 66	350	RMS B16-A4/4.000"-2SVHS	RMS B16-A4/4.000"-3SVHS
4.125	5.000	2.000	243	247	X 70 R1	X 68	351	RMS B16-A4/4.125"-2SVHS	RMS B16-A4/4.125"-3SVHS
4.250	5.125	2.000	244	248	X 72 R2	X 70	352	RMS B16-A4/4.250"-2SVHS	RMS B16-A4/4.250"-3SVHS
4.375	5.250	2.000	245	249	X 74 R1	X 72	353	RMS B16-A4/4.375"-2SVHS	RMS B16-A4/4.375"-3SVHS
4.500	5.375	2.000	246	250	X 76 R2	X 74	354	RMS B16-A4/4.500"-2SVHS	RMS B16-A4/4.500"-3SVHS

RMS U-11 BTB - Unbalanced Rotary Multi Springs



RMS U-11 BTB. Unbalance Mechanical Seal

Multi spring type, double mechanical seals back to back, recommended for liquids which do not form lubricating film and for toxic, flammable and explosive media. Use of barrier or buffer fluid system assures reliable run of the seal providing lubrication, cooling and removal of deposits from sliding faces area.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers / PTFE Wedge

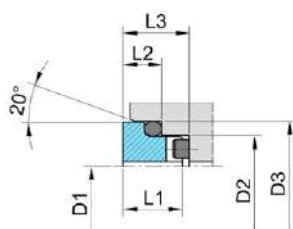
Seal Characteristic

- Double Seal.
- Multi Spring
- Unbalanced Seal
- Independent of direction of rotation

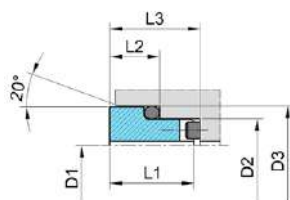
Applications

- General Chemicals

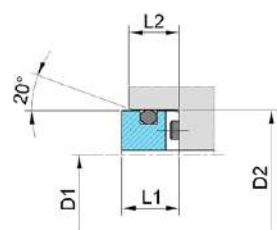
STATIONARY RINGS



A4



A9



B1

Components

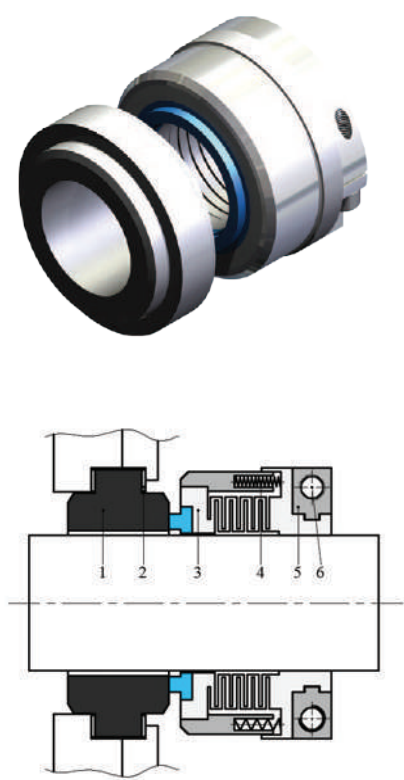
1. Stationary Packing
2. Stationary Face
3. Rotary Face
4. Rotary Packing
5. Spring
6. Back-up Ring
7. Set Screw
8. Spring Holder

Performance Range

Shaft Diameter	25 – 120mm
Pressure	10 bar [max]
Temperature	-20 ~ 180 °C
Velocity	20 m/sec

STATIONARY RINGS	
A4	A9
B1	

DRS. External Balanced Mechanical Seal.



DRS. External Balanced Mechanical Seal.

Non pusher type, external mounted seal designed for extremely corrosive application such as acids, salts, organic compounds and reducing agents. Reverse balance design for vacuum as well as pressure applications. Simple in construction for installation and maintenance.

Materials

Seal Face	Carbon, SiC, Tung. Carbide
Metal Parts	SS 316, Hastelloy C
	Bellows PTFE

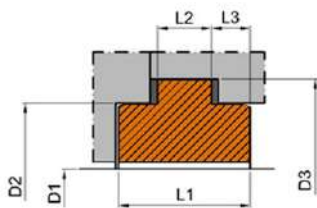
Seal Characteristic

- Single , outside mounted seal
- Balance seal, with multi spring
- Independent of direction of rotation

Applications

- Extremely Corrosive application
- Most suitable for Mixer, Reaction vessel, Fermenters , etc

STATIONARY RINGS



STATIONARY RINGS	
T	L

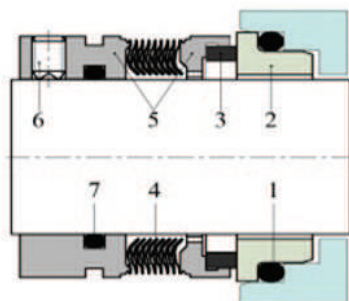
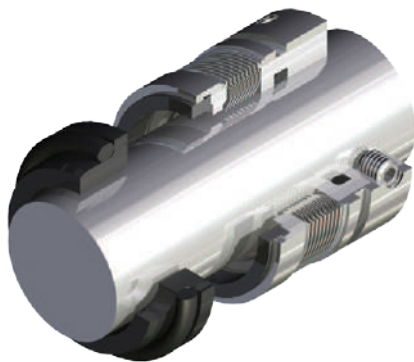
Components

1. Stationary
2. Stationary Packing
3. PTFE Bellows
4. Spring
5. Collar
6. Cap Screw

Performance Range

Shaft Diameter	25 - 100mm
Pressure	6 bar [max]
Temperature	-45 ~ 120 °C
Velocity	15 m/sec

RMBS B-13 - Rotary Metal Bellows Seal Low Temperature



RMBS B -13 - Rotary Metal Bellows Seal Low Temperature

Series of Rotating Metal Bellows seals, static o-ring is used as a secondary member. The absence of dynamic o-ring prevents possibility of seal hang-up or damage the shaft or sleeves.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C,
Secondary Seals	Elastomers

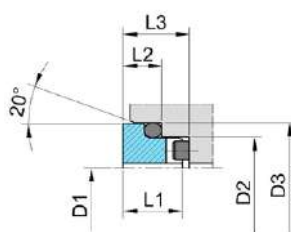
Seal Characteristic

- Single Seal.
- Metal Bellows
- Balanced Seal
- Independent of direction of rotation

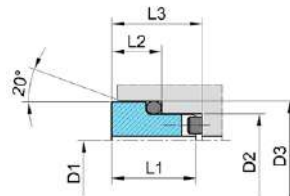
Applications

- General Chemicals.
- Petrochemicals
- Refineries

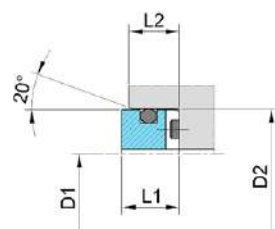
STATIONARY RINGS



A4



A9



B1

Components

1. Stationary Packing
2. Stationary Face
3. Rotary Face
4. Metal Bellows Spring
5. Retainer Ring
6. Set Screw
7. Rotary Packing

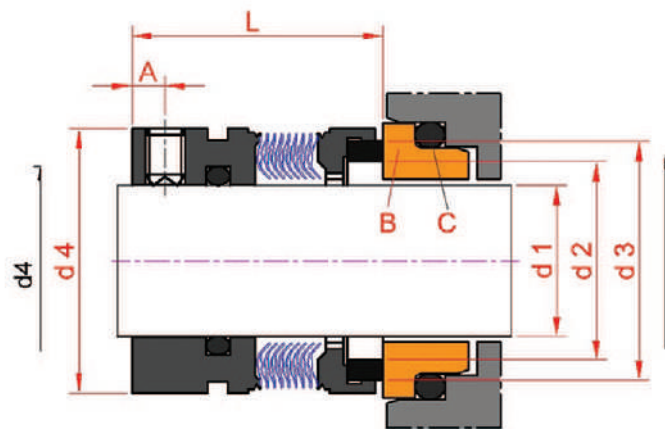
Performance Range

Shaft Diameter	25 to 100mm
Pressure	20 bar
Temperature	-60 to 240 °C
Velocity	25 m/sec

STATIONARY RINGS	
A4	A9
B1	

RMBS B-13 - Rotary Metal Bellows Seal Low Temperature

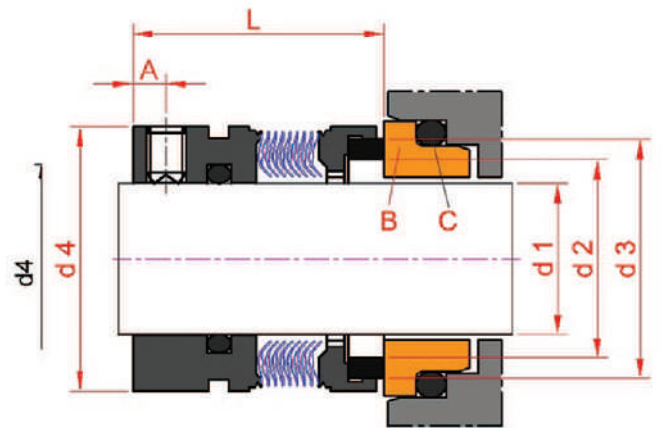
Dimensional Data – INCH



Dash	d1	d2	d3	d4	A	B	C	L	SEAL CODE
X12	0.75	0.984	1.185	1.312	0.165	X12	216	1.25	RMBS B13-A4/0.75"-ASVHS
X14	0.875	1.11	1.315	1.437	0.165	X14	218	1.25	RMBS B13-A4/0.875"-ASVHS
X15	0.937	1.201	1.406	1.535	0.165	X15	220	1.25	RMBS B13-A4/0.937"-ASVHS
X16	1	1.236	1.437	1.562	0.165	X16	220	1.25	RMBS B13-A4/1.0"-ASVHS
X18	1.125	1.362	1.567	1.687	0.165	X18	222	1.25	RMBS B13-A4/1.125"-ASVHS
X20	1.25	1.516	1.72	1.812	0.175	X20	223	1.312	RMBS B13-A4/1.250"-ASVHS
X22	1.375	1.642	1.846	1.937	0.214	X22	224	1.437	RMBS B13-A4/1.375"-ASVHS
X24	1.5	1.717	1.969	2.062	0.214	X24	225	1.437	RMBS B13-A4/1.500"-ASVHS
X26	1.625	1.843	2.094	2.187	0.214	X26	227	1.437	RMBS B13-A4/1.625"-ASVHS
X28	1.75	1.965	2.22	2.313	0.214	X28	228	1.437	RMBS B13-A4/1.750"-ASVHS
X30	1.875	2.091	2.346	2.437	0.214	X30	229	1.496	RMBS B13-A4/1.875"-ASVHS
X32	2	2.217	2.472	2.562	0.21	X32	230	1.5	RMBS B13-A4/2.000"-ASVHS
X34	2.125	2.339	2.594	2.687	0.21	X34	232	1.5	RMBS B13-A4/2.125"-ASVHS
X36	2.25	2.465	2.72	2.812	0.214	X36	233	1.562	RMBS B13-A4/2.250"-ASVHS
X38	2.375	2.591	2.846	2.937	0.214	X38	234	1.562	RMBS B13-A4/2.375"-ASVHS
X40	2.5	2.791	3.094	3.187	0.214	X40	235	1.562	RMBS B13-A4/2.500"-ASVHS
X42	2.625	2.913	3.22	3.312	0.216	X42	235	1.625	RMBS B13-A4/2.625"-ASVHS
X44	2.75	3.039	3.346	3.437	0.216	X44	236	1.625	RMBS B13-A4/2.750"-ASVHS
X46	2.875	3.197	3.504	3.625	0.216	X46	340	1.687	RMBS B13-A4/2.875"-ASVHS
X48	3	3.323	3.626	3.75	0.225	X48	341	1.687	RMBS B13-A4/3.000"-ASVHS
X50	3.125	3.437	3.772	3.875	0.237	X50	342	1.75	RMBS B13-A4/3.125"-ASVHS
X52	3.25	3.563	3.898	4	0.237	X52	343	1.75	RMBS B13-A4/3.250"-ASVHS
X54	3.375	3.685	4.024	4.125	0.237	X54	344	1.75	RMBS B13-A4/3.375"-ASVHS
X56	3.5	3.811	4.146	4.25	0.29	X56	346	1.875	RMBS B13-A4/3.500"-ASVHS
X58	3.625	3.937	4.272	4.375	0.29	X58	346	1.875	RMBS B13-A4/3.625"-ASVHS
X60	3.75	4.063	4.398	4.5	0.29	X60	347	1.875	RMBS B13-A4/3.750"-ASVHS
X62	3.875	4.185	4.524	4.625	0.29	X62	348	1.875	RMBS B13-A4/3.875"-ASVHS
X64	4	4.311	4.646	4.75	0.29	X64	349	1.785	RMBS B13-A4/4.000"-ASVHS

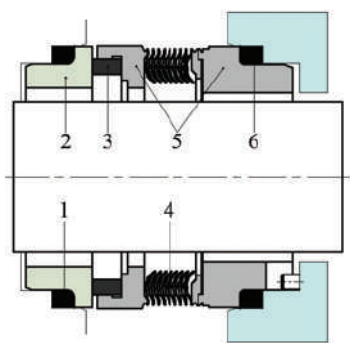
RMBS B-13 - Rotary Metal Bellows Seal Low Temperature

Dimensional Data – METRIC

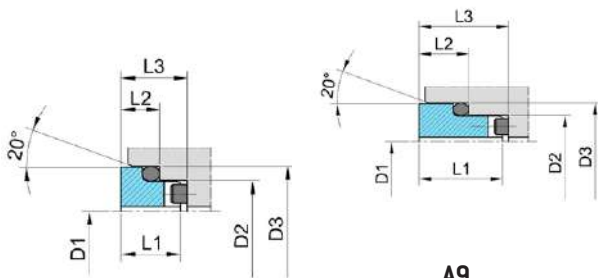


Dash	d1	d2	d3	d4	A	B	C	L	SEAL CODE
-020	20	25	30.1	33.3	3.5	X14	218	27.5	RMBS B13-A4/020-ASVHS
-022	22	28.2	33.4	36.5	3.7	X15	220	27.5	RMBS B13-A4/022-ASVHS
-024	24	30.5	35.7	39	4	X16	220	30	RMBS B13-A4/024-ASVHS
-025	25	30.5	35.7	39	4	X18	222	30	RMBS B13-A4/025-ASVHS
-026	26	33.5	38.7	42	4	X18	222	32.5	RMBS B13-A4/026-ASVHS
-028	28	33.5	38.7	42	4	X20	223	32.5	RMBS B13-A4/028-ASVHS
-030	30	35.5	40.7	44	4	X20	223	32.5	RMBS B13-A4/030-ASVHS
-032	32	38.5	43.7	46	4	X22	224	32.5	RMBS B13-A4/032-ASVHS
-034	34	41.7	46.9	49.2	4	X23	224	32.5	RMBS B13-A4/034-ASVHS
-035	35	41.7	46.9	49.2	4	X24	225	32.5	RMBS B13-A4/035-ASVHS
-038	38	43.6	50	52.4	4	X26	227	34	RMBS B13-A4/038-ASVHS
-040	40	46.8	53.2	55.55	4	X26	227	34	RMBS B13-A4/040-ASVHS
-042	42	49.9	56.4	58.7	4.5	X28	228	34	RMBS B13-A4/042-ASVHS
-043	43	49.9	56.4	58.7	4.5	X28	228	34	RMBS B13-A4/043-ASVHS
-044	44	49.9	56.4	58.7	4.5	X30	229	34	RMBS B13-A4/044-ASVHS
-045	45	49.9	56.4	58.7	4.5	X30	229	34	RMBS B13-A4/045-ASVHS
-048	48	53.1	59.4	61.9	4.5	X32	230	34	RMBS B13-A4/048-ASVHS
-050	50	56.3	62.8	65.1	4.5	X34	232	34.5	RMBS B13-A4/050-ASVHS
-052	52	59.4	65.9	68.25	4.5	X34	232	34.5	RMBS B13-A4/052-ASVHS
-053	53	59.4	65.9	68.25	4.5	X35	232	34.5	RMBS B13-A4/053-ASVHS
-054	54	59.4	65.9	68.25	4.5	X36	233	34.5	RMBS B13-A4/054-ASVHS
-055	55	60.9	67.4	69.7	4.5	X36	233	34.5	RMBS B13-A4/055-ASVHS
-058	58	65.8	72.3	74.6	4.5	X38	234	39.5	RMBS B13-A4/058-ASVHS
-060	60	65.8	72.3	74.6	4.5	X40	235	39.5	RMBS B13-A4/060-ASVHS
-062	62	70.9	78.6	80.95	4.5	X40	235	39.5	RMBS B13-A4/062-ASVHS
-063	63	70.9	78.6	80.95	4.5	X42	235	39.5	RMBS B13-A4/063-ASVHS
-065	65	74	81.8	84.1	5.5	X42	235	39.5	RMBS B13-A4/065-ASVHS
-070	70	77.2	85	87.3	6.5	X46	340	45	RMBS B13-A4/070-ASVHS
-072	72	81.2	89	92.1	6.5	X46	340	45	RMBS B13-A4/072-ASVHS
-075	75	84.4	92.1	95.25	6.5	X50	342	45	RMBS B13-A4/075-ASVHS
-080	80	87.3	95.8	98.45	6.5	X52	343	44.5	RMBS B13-A4/080-ASVHS
-082	82	90.5	99	101.6	6.5	X54	344	44.5	RMBS B13-A4/082-ASVHS
-085	85	93.7	102.2	104.8	6.5	X56	346	44.5	RMBS B13-A4/085-ASVHS
-090	90	96.8	105.3	107.95	6.5	X58	346	49.5	RMBS B13-A4/090-ASVHS
-092	92	100	108.5	111.15	6.5	X60	347	49.5	RMBS B13-A4/092-ASVHS
-095	95	103.2	111.7	114.3	6.5	X62	348	49.5	RMBS B13-A4/095-ASVHS
-100	100	109.5	118	120.65	6.5	X64	349	49.5	RMBS B13-A4/100-ASVHS

SMBS HT-14 - Stationary Metal Bellows Seal High Temperature



STATIONARY RINGS



A4

A9

STATIONARY RINGS	
A4	A9

SMBS HT-14

Series of Stationary Metal Bellow design, specially designed for high temperature application. As a standard, Inconel 718 bellows cores. Grafoil is used as a secondary member having excellent temperature range up to 400°C.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Inconel 718
Secondary Seals	Graphite Ring

Seal Characteristic

- Single Seal.
- Metal Bellow
- Balanced Seal
- Independent of direction of rotation

Applications

- General Chemicals.
- Petrochemicals
- Refineries

Components

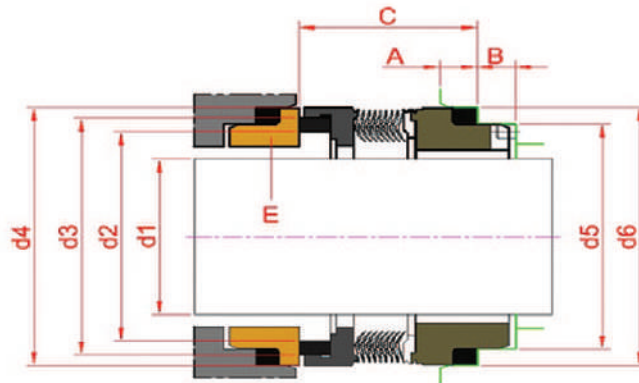
1. Rotary Packing
2. Stationary Face
3. Rotary Face
4. Metal Bellows Spring
5. Retainer Ring
6. Stationary Packing

Performance Range

Shaft Diameter	25 ~ 100mm
Pressure	20 bar
Temperature	-60 ~ 400 °C
Velocity	35 m/sec

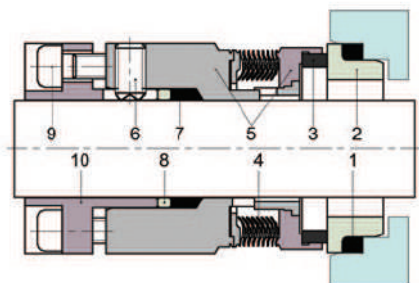
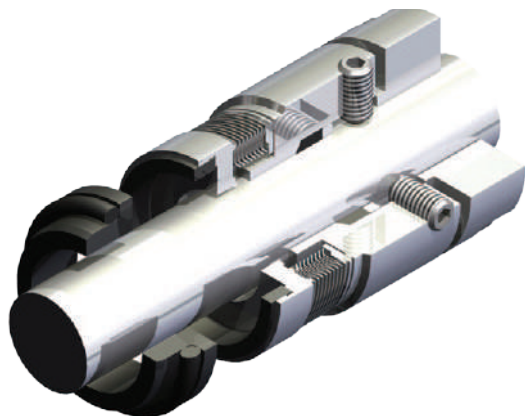
SMBS HT-14 - Stationary Metal Bellows Seal High Temperature

Dimensional Data – INCH



Dash	d1	d2	d3	d4	d5	d6	A	B	C	E	SEAL CODE
X18	25.40	34.67	39.75	44.45	38.30	44.45	6.00	6.10	28.90	X16	SMBS HT 14-A4/1.000"ASGIS
X20	28.58	38.58	43.66	47.63	41.50	47.63	6.00	6.10	28.50	X18	SMBS HT 14-A4/1.125"ASGIS
X22	31.75	41.78	46.86	50.80	44.70	50.80	6.00	6.10	28.90	X20	SMBS HT 14-A4/1.250"ASGIS
X24	34.93	43.69	50.04	53.98	47.90	53.98	6.00	6.10	28.90	X22	SMBS HT 14-A4/1.375"ASGIS
X26	38.10	46.86	53.21	57.15	54.20	60.33	7.00	6.40	30.20	X24	SMBS HT 14-A4/1.500"ASGIS
X28	41.28	50.04	56.39	60.33	54.20	60.33	7.00	6.40	31.00	X26	SMBS HT 14-A4/1.625"ASGIS
X30	44.45	53.21	59.56	63.50	57.40	63.50	7.00	6.40	31.80	X28	SMBS HT 14-A4/1.750"ASGIS
X32	47.63	56.41	62.76	66.68	60.66	66.68	7.00	6.40	31.80	X30	SMBS HT 14-A4/1.875"ASGIS
X34	50.80	59.56	65.91	69.85	63.70	69.85	7.00	6.40	32.60	X32	SMBS HT 14-A4/2.000"ASGIS
X36	53.98	62.76	69.11	73.03	70.10	76.20	7.50	7.60	33.40	X34	SMBS HT 14-A4/2.125"ASGIS
X38	57.15	65.94	72.29	76.20	73.30	79.38	7.50	7.60	34.20	X36	SMBS HT 14-A4/2.250"ASGIS
X40	60.33	71.02	78.64	82.55	76.40	82.55	7.50	7.60	35.00	X38	SMBS HT 14-A4/2.375"ASGIS
X42	63.50	74.19	81.81	85.73	79.60	85.73	7.50	7.60	35.80	X40	SMBS HT 14-A4/2.500"ASGIS
X44	66.68	77.39	85.01	88.90	82.80	88.90	7.50	8.70	36.60	X42	SMBS HT 14-A4/2.625"ASGIS
X46	69.85	81.33	88.95	93.65	85.60	95.25	9.50	5.80	40.80	X44	SMBS HT 14-A4/2.750"ASGIS
X48	73.03	84.51	92.13	96.82	89.00	98.43	9.50	5.80	40.80	X46	SMBS HT 14-A4/2.875"ASGIS
X50	76.20	87.43	95.81	101.60	92.20	101.60	9.50	5.80	40.80	X48	SMBS HT 14-A4/3.000"ASGIS
X52	79.38	90.60	98.98	104.78	95.30	104.78	9.50	5.80	40.80	X50	SMBS HT 14-A4/3.125"ASGIS
X54	82.55	93.78	102.16	107.95	98.50	107.95	9.50	5.80	40.80	X52	SMBS HT 14-A4/3.250"ASGIS
X56	85.73	96.95	105.33	111.13	101.70	111.13	9.50	5.80	40.80	X54	SMBS HT 14-A4/3.375"ASGIS
X58	88.90	100.13	108.51	114.30	104.90	114.30	10.00	6.90	41.90	X56	SMBS HT 14-A4/3.500"ASGIS
X60	92.08	103.30	111.68	117.48	108.10	117.48	10.00	6.90	41.90	X58	SMBS HT 14-A4/3.625"ASGIS
X62	95.25	106.48	114.86	120.65	111.20	120.65	10.00	6.90	41.90	X60	SMBS HT 14-A4/3.750"ASGIS
X64	98.43	109.65	118.03	123.83	114.40	123.83	10.00	6.90	41.90	X62	SMBS HT 14-A4/3.875"ASGIS

RMBS HT-16 - Rotary Metal Bellows Seal High Temperature



RMBS HT-16

Series of Rotating Metal Bellows seals, specially designed for high temperature application and suitable for high start-up torque since the bellows unit is independent of torque transmission. Grafoil is used as a secondary member having excellent temperature range upto 400°C.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Inconel 718
Secondary Seals	Graphite

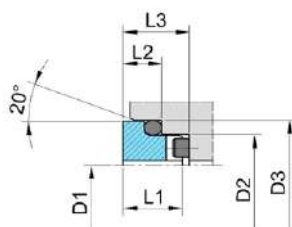
Seal Characteristic

- Single Seal.
- Metal Bellow
- Balanced Seal
- Independent of direction of rotation

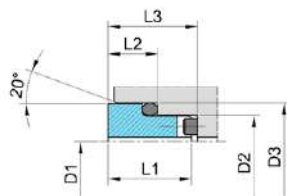
Applications

- General Chemicals.
- Petrochemicals
- Refineries

STATIONARY RINGS



A4



A9

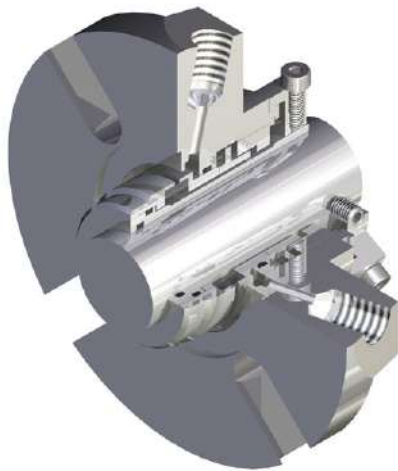
STATIONARY RINGS	
A4	A9

Components

1. Graphite Stationary Packing
2. Stationary Face
3. Rotary Seal Face
4. Metal Bellow Spring
5. Retainer Ring
6. Set Screw
7. Graphite Rotary Packing
8. Compression Ring
9. Cap Screw
10. Collar Compression

Performance Range

Shaft Diameter	20 ~ 100mm
Pressure	20 bar
Temperature	-60 ~ 400 °C
Velocity	35 m/sec

SMS EA-400 SA - Single Cartridge Seal

Type is a compact cartridge balance seal, specially developed for handling slurries, sludges, hot and cold water, oil, fuel. In the cartridge construction the spring are isolated from the fluid enhancing the seal life. The full-featured gland design incorporates quench/drain option and fixed bushing and external flushing installation.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers

Seal Characteristic

- Single Seal.
- Balanced seal
- Dependent of direction of rotation
- Cartridge Unit

Applications

- Pulp & Paper
- Slurry pump and Sludge pump
- Hydrocarbon and oils
- Light Chemical

Components

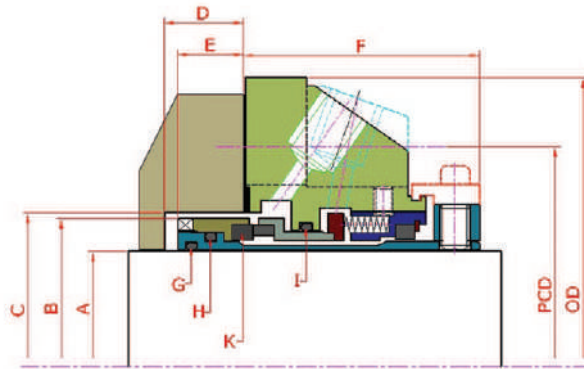
1. Stationary Packing	11. Set Screw
2. Stationary Face	12. Drive Collar
3. Rotary Face	13. Set Screw
4. Rotary Packing	14. Cap Screw
5. Sleeve Cartridge	15. Setting Clip
6. Sleeve Cartridge Packing	16. Packing Gland
7. Spring	17. Gland
8. Ring Anti Rotating	18. Sleeve
9. Bushing	19. Sleeve Packing
10. Cir-Clip	

Performance Range

Shaft Diameter	25 ~ 120mm
Pressure	25 bar [max]
Temperature	-60 ~ 400 °C
Velocity	35 m/sec

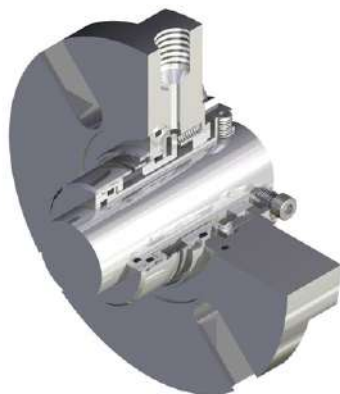
SMS EA-400 SA - Stationary Multi Springs type A

Dimensional Data – METRIC



D	E	F	G	H	I	J	JML Spring	OD	PCD	Shaft Size [A]		G	H	K	I	SEAL CODE		SEAL CODE	
										Metrik	Inch			Ring		Insert Rot / Stat.		Insert Rot / Stat.	
19	15.4	44.2	120	122	125	10	12	113	71	25	1.00"	120	122	X 16 R1	125	EA 400 S A-X/025-32VHS		EA 400 S A-X/025-33VHS	
17.8	15.4	44.2	122	124	127	10	12	116	74	28	1.125"	122	124	X 18 R1	127	EA 400 S A-X/028-32VHS		EA 400 S A-X/028-33VHS	
21.2	15.4	44.2	123	125	128	10	12	118	76	30	1.1875"	123	125	X 20 R2	128	EA 400 S A-X/030-32VHS		EA 400 S A-X/030-33VHS	
21.2	15.4	44.2	124	126	129	10	12	120	78	32	1.250"	124	126	X 20 R2	129	EA 400 S A-X/032-32VHS		EA 400 S A-X/032-33VHS	
21.2	15.4	44.2	125	127	130	10	12	121	79	33	1.3125"	125	127	X 22 R2	130	EA 400 S A-X/033-32VHS		EA 400 S A-X/033-33VHS	
21.2	15.4	44.2	126	128	131	12	12	123	81	35	1.375"	126	128	X 22 R1	131	EA 400 S A-X/035-32VHS		EA 400 S A-X/035-33VHS	
21.2	15.4	44.2	128	130	133	12	12	126	84	38	1.50"	128	130	X 24 R1	133	EA 400 S A-X/038-32VHS		EA 400 S A-X/038-33VHS	
21.2	15.4	44.2	129	132	134	12	12	128	86	40	1.5625"	129	132	X 26 R2	134	EA 400 S A-X/040-32VHS		EA 400 S A-X/040-33VHS	
20	15.7	49.3	131	133	137	12	16	131	92	43	1.6875"	131	133	X 28 R1	137	EA 400 S A-X/043-32VHS		EA 400 S A-X/043-33VHS	
20	15.7	49.3	132	135	138	12	16	133	95	45	1.75"	132	135	X 30 R2	138	EA 400 S A-X/045-32VHS		EA 400 S A-X/045-33VHS	
20	15.7	49.3	134	137	140	12	16	136	98	48	1.875"	134	137	X 32 R2	140	EA 400 S A-X/048-32VHS		EA 400 S A-X/048-33VHS	
20	17.2	51.8	135	128	141	14	16	138	100	50	-	135	138	X 32 R2	141	EA 400 S A-X/050-32VHS		EA 400 S A-X/050-33VHS	
20	17.2	51.8	139	142	145	14	18	143	105	55	2.1875"	139	142	X 36 R1	145	EA 400 S A-X/055-32VHS		EA 400 S A-X/055-33VHS	
20	17.2	51.8	142	145	148	14	18	148	110	60	2.375"	142	145	X 38 R1	148	EA 400 S A-X/060-32VHS		EA 400 S A-X/060-33VHS	
20	17.2	51.8	145	148	151	14	18	158	119	65	2.5625"	145	148	X 42 R1	151	EA 400 S A-X/065-32VHS		EA 400 S A-X/065-33VHS	
20	17.2	51.8	232	234	236	14	20	168	127	70	2.750"	232	234	X 48 R2	236	EA 400 S A-X/070-32VHS		EA 400 S A-X/070-33VHS	
20	17.2	51.8	234	235	237	16	20	173	132	75	-	234	234	X 50 R2	237	EA 400 S A-X/075-32VHS		EA 400 S A-X/075-33VHS	
20	17.2	51.8	235	237	239	16	20	178	137	80	-	235	237	X 52 R1	239	EA 400 S A-X/080-32VHS		EA 400 S A-X/080-33VHS	
20	17.2	51.8	237	238	240	16	24	182	142	85	3.375	237	238	X 54 R1	240	EA 400 S A-X/085-32VHS		EA 400 S A-X/085-33VHS	
20	17.2	51.8	239	240	242	16	24	188	147	90	-	239	240	X 56 R1	242	EA 400 S A-X/090-32VHS		EA 400 S A-X/090-33VHS	
20	17.2	51.8	240	242	244	16	24	192	152	95	3.750"	240	242	X 60 R1	244	EA 400 S A-X/095-32VHS		EA 400 S A-X/095-33VHS	
20	17.2	51.8	242	243	245	16	24	198	156	100	4.00"	242	243	X 64 R1	245	EA 400 S A-X/100-32VHS		EA 400 S A-X/100-33VHS	
20	17.2	51.8	245	246	248	16	24	210	166	110	4.375"	245	246	X 70 R1	248	EA 400 S A-X/110-32VHS		EA 400 S A-X/110-33VHS	
20	17.2	51.8	248	250	252	16	24	220	176	120	4.750"	248	250	X 76 R1	252	EA 400 S A-X/120-32VHS		EA 400 S A-X/120-33VHS	

SMS EA-400 SB - Stationary Multi Springs Type B



Type is a compact cartridge balance seal, specially developed for handling slurries, sludges, hot and cold water, oil, fuel. In the cartridge construction the spring are isolated from the fluid enhancing the seal life. The full-featured gland design incorporates quench/drain option and fixed bushing and external flushing installation.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers

Seal Characteristic

- Single Seal.
- Balanced seal
- Dependent of direction of rotation
- Cartridge Unit

Applications

- Pulp & Paper
- Slurry pump and Sludge pump
- Hydrocarbon and oils
- Heavy Chemical

Components

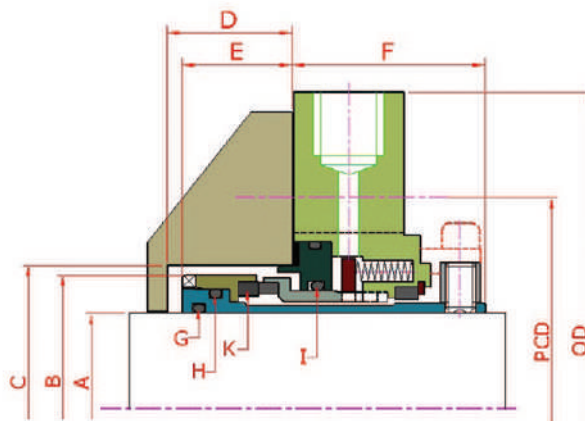
1. Stationary Packing	11. Set Screw
2. Stationary Face	12. Drive Collar
3. Rotary Face	13. Set Screw
4. Rotary Packing	14. Cap Screw
5. Sleeve Cartridge	15. Setting Clip
6. Sleeve Cartridge Packing	16. Packing Gland
7. Spring	17. Gland
8. Ring Anti Rotating	18. Sleeve
9. Bushing	19. Sleeve Packing
10. Cir-Clip	

Performance Range

Shaft Diameter	25 ~ 120mm
Pressure	25 bar [max]
Temperature	-60 ~ 400 °C
Velocity	35 m/sec

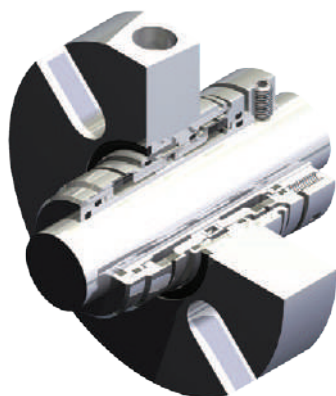
SMS EA-400 SB - Stationary Multi Springs Type B

Dimensional Data – METRIC



A	B	C Min	D	E	F	G	H	I	J	JML Spring	OD	PCD	SEAL CODE Insert Rot / Stat.	SEAL CODE Insert Rot / Stat.
25	40.2	44	19	15.4	44.2	120	122	125	10	12	113	71	EA 400 S B-X/025-32VHS	EA 400 S B-X/025-33VHS
28	44.1	48	17.8	15.4	44.2	122	124	127	10	12	116	74	EA 400 S B-X/028-32VHS	EA 400 S B-X/028-33VHS
30	45.8	49	21.2	15.4	44.2	123	125	128	10	12	118	76	EA 400 S B-X/030-32VHS	EA 400 S B-X/030-33VHS
32	48.5	51	21.2	15.4	44.2	124	126	129	10	12	120	78	EA 400 S B-X/032-32VHS	EA 400 S B-X/032-33VHS
33	49	52	21.2	15.4	44.2	125	127	130	10	12	121	79	EA 400 S B-X/033-32VHS	EA 400 S B-X/033-33VHS
35	50.5	54	21.2	15.4	44.2	126	128	131	12	12	123	81	EA 400 S B-X/035-32VHS	EA 400 S B-X/035-33VHS
38	53.7	57	21.2	15.4	44.2	128	130	133	12	12	126	84	EA 400 S B-X/038-32VHS	EA 400 S B-X/038-33VHS
40	55.6	59	21.2	15.4	44.2	129	132	134	12	12	128	86	EA 400 S B-X/040-32VHS	EA 400 S B-X/040-33VHS
43	61.2	64	20	15.7	49.3	131	133	137	12	16	131	92	EA 400 S B-X/043-32VHS	EA 400 S B-X/043-33VHS
45	62.2	64	20	15.7	49.3	132	135	138	12	16	133	95	EA 400 S B-X/045-32VHS	EA 400 S B-X/045-33VHS
48	66.6	69	20	15.7	49.3	134	137	140	12	16	136	98	EA 400 S B-X/048-32VHS	EA 400 S B-X/048-33VHS
50	67.2	70	20	17.2	51.8	135	128	141	14	16	138	100	EA 400 S B-X/050-32VHS	EA 400 S B-X/050-33VHS
55	72.2	76	20	17.2	51.8	139	142	145	14	18	143	105	EA 400 S B-X/055-32VHS	EA 400 S B-X/055-33VHS
60	78.1	81	20	17.2	51.8	142	145	148	14	18	148	110	EA 400 S B-X/060-32VHS	EA 400 S B-X/060-33VHS
65	86.1	89	20	17.2	51.8	145	148	151	14	18	158	119	EA 400 S B-X/065-32VHS	EA 400 S B-X/065-33VHS
70	91.1	94	20	17.2	51.8	232	234	236	14	20	168	127	EA 400 S B-X/070-32VHS	EA 400 S B-X/070-33VHS
75	96.1	99	20	17.2	51.8	234	235	237	16	20	173	132	EA 400 S B-X/075-32VHS	EA 400 S B-X/075-33VHS
80	101.1	104	20	17.2	51.8	235	237	239	16	20	178	137	EA 400 S B-X/080-32VHS	EA 400 S B-X/080-33VHS
85	106.1	109	20	17.2	51.8	237	238	240	16	24	182	142	EA 400 S B-X/085-32VHS	EA 400 S B-X/085-33VHS
90	111.1	114	20	17.2	51.8	239	240	242	16	24	188	147	EA 400 S B-X/090-32VHS	EA 400 S B-X/090-33VHS
95	116.1	119	20	17.2	51.8	240	242	244	16	24	192	152	EA 400 S B-X/095-32VHS	EA 400 S B-X/095-33VHS
100	121.1	124	20	17.2	51.8	242	243	245	16	24	198	156	EA 400 S B-X/100-32VHS	EA 400 S B-X/100-33VHS
110	131.1	134	20	17.2	51.8	245	246	248	16	24	210	166		
120	141.1	144	20	17.2	51.8	248	250	252	16	24	220	176		

SMS EA-400 DA – Dual Cartridge Seal Type A



Type is a compact cartridge balance seal, specially developed for handling slurries, sludges, thick syrups and polymerising fluids. In the cartridge construction the spring are isolated from the fluid enhancing the seal life. The off-set gland design is very efficient in barrier fluid exchange when compared to most other cartridge seals.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers

Seal Characteristic

- Single Seal.
- Balanced seal
- Dependent of direction of rotation
- Cartridge Unit

Applications

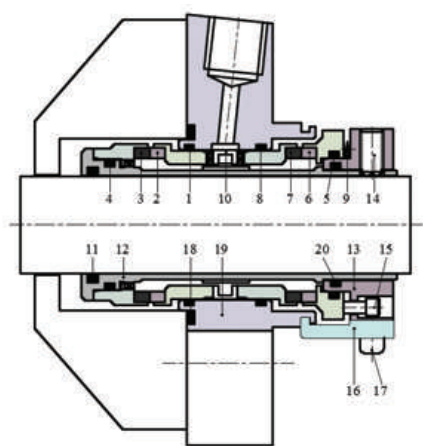
- Hydrocarbons and oils.
- Slurry pump and sludge pump
- Pulp and Paper

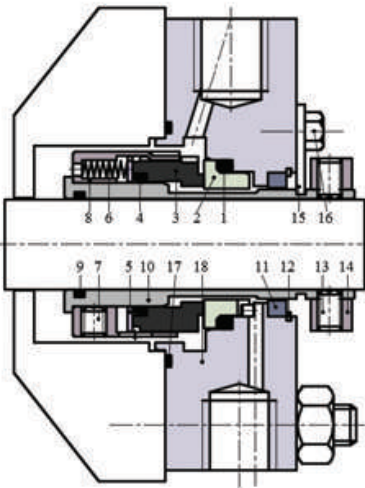
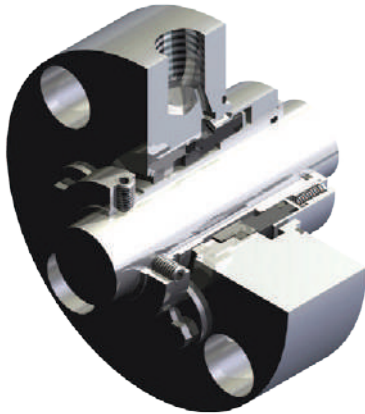
Components

- | | |
|------------------------|--------------------|
| 1. Stationary Packing | 12. Sleeve |
| 2. Stationary Face | 13. Drive Collar |
| 3. Rotary Face | 14. Set Screw |
| 4. Rotary Packing | 15. Cap Screw |
| 5. Rotary Packing | 16. Setting Clip |
| 6. Rotary Face | 17. Cap Screw |
| 7. Stationary Face | 18. Packing Gland |
| 8. Stationary Packing | 19. Gland |
| 9. Spring | 20. Collar Packing |
| 10. Ring Anti Rotating | |
| 11. Sleeve packing | |

Performance Range

Shaft Diameter	25 ~ 120mm
Pressure	20 bar [max]
Temperature	-20 ~ 220 °C
Velocity	20 m/sec



RMS B-13 SC – Single Cartridge Seal

Multi spring type, are designed for heavy duty service involving high pressure and sliding velocities. This seal has positive drive arrangement. The seal is supplied as a cartridge unit and can be directly bolted to stuffing box. These seals are normally used in main oil pipelines, water injection pump and boiler feed water pump.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers

Seal Characteristic

- Single Seal
- Balanced Seal
- Independent of direction of rotation.
- Choice of throttle bushing design : fixed floating,
- Standard API 682 Arrangement 1 Type A

Applications

- Petrochemical industry
- Oil and gas industry
- Boiler Feed Water Pump

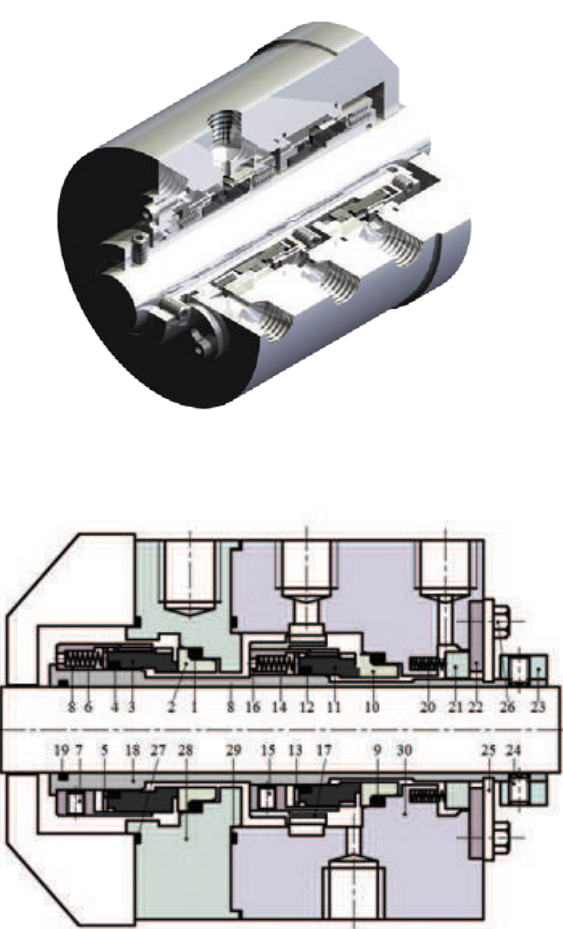
Components

- | | |
|-----------------------|-------------------|
| 1. Stationary Packing | 12. Cir-Clip |
| 2. Stationary Face | 13. Cap screw |
| 3. Rotary Face | 14. Drive Collar |
| 4. Rotary Packing | 15. Setting Clip |
| 5. Backup Ring | 16. Hex Head Bolt |
| 6. Spring | 17. Packing Gland |
| 7. Set Screw | 18. Gland |
| 8. Spring Holder | |
| 9. Sleeve Packing | |
| 10. Sleeve | |
| 11. Bushing | |

Performance Range

Shaft Diameter	25 ~ 130mm
Pressure	Up to 50 bar [max]
Temperature	-20 ~ 220 °C
Velocity	20 m/sec

RMS B-13 DC. Dual Cartridge Seal



Multi spring type, are designed for heavy duty service involving high pressure and sliding velocities. This seal has positive drive arrangement. The seal is supplied as a cartridge unit and can be directly bolted to stuffing box. Seal face geometry enables use of face to back configuration which is preferred in many dual seal application.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers

Seal Characteristic

- Dual Seal
- Balanced Seal
- Independent of direction of rotation.
- Standard API 682 Arrangement 3 Type A for pressurized barrier configurations.

Applications

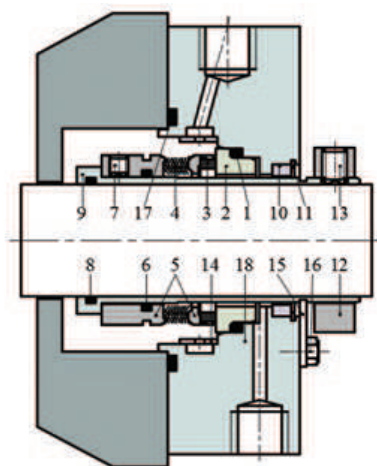
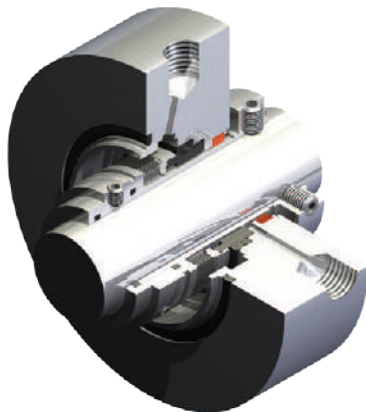
- Petrochemical industry
- Oil and Gas industry
- Process pumps

Components

- | | |
|-----------------------|-----------------------------|
| 1. Stationary Packing | 17. Pumping |
| 2. Stationary Face | 18. Sleeve |
| 3. Rotary Face | 19. Sleeve Packing |
| 4. Rotary Packing | 20. Spring |
| 5. Backup Ring | 21. Bushing |
| 6. Spring | 22. Clamping Plate |
| 7. Set Screw | 23. Drive Collar |
| 8. Spring Holder | 24. Set Screw |
| 9. Stationary Packing | 25. Setting Clip |
| 10. Stationary Face | 26. Hex Head Bolt |
| 11. Rotary Face | 27. Packing Auxiliary Gland |
| 12. Rotary Packing | 28. Auxiliary Gland |
| 13. Backup Ring | 29. Packing Gland |
| 14. Spring | 30. Gland |
| 15. Set Screw | |
| 16. Spring Holder | |

Performance Range

Shaft Diameter	25 ~ 130mm
Pressure	Up to 50 bar [max]
Temperature	-20 ~ 220 °C
Velocity	20 m/sec

RMBS B-13 SC – Single Cartridge Seal

Series of Rotating Metal Bellow seals, static o-ring is used as a secondary member. The absence of dynamic o-ring prevents possibility of seal hang-up or damage the shaft or sleeves. For chemical compatibility Alloy C-276 bellow cores can be used.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers

Seal Characteristic

- Single Seal
- Balanced Seal
- Independent of direction of rotation.
- Standard API 682 Arrangement 3 Type A for pressurized barrier configurations.

Applications

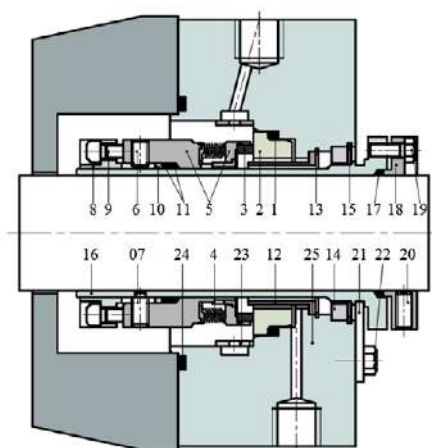
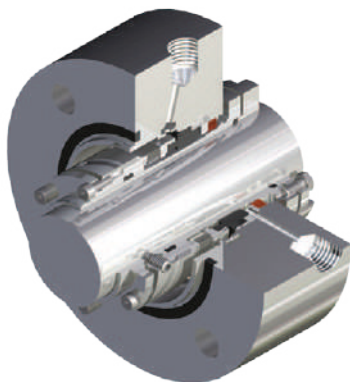
- Petrochemical industry
- Oil and Gas industry
- Process pumps

Components

- | | |
|-----------------------|-------------------|
| 1. Stationary Packing | 11. Bushing |
| 2. Stationary Face | 12. Cir-Clip |
| 3. Rotary Face | 13. Cap screw |
| 4. Rotary Packing | 14. Drive Collar |
| 5. Backup Ring | 15. Setting Clip |
| 6. Spring | 16. Hex Head Bolt |
| 7. Set Screw | 17. Packing Gland |
| 8. Spring Holder | 18. Gland |
| 9. Sleeve Packing | |
| 10. Sleeve | |

Performance Range

Shaft Diameter	25 ~ 100mm
Pressure	Up to 20 bar [max]
Temperature	-60 ~ 250 °C
Velocity	25 m/sec

RMBS HT-19 SC – Single Cartridge Seal

Series of Rotating Metal Bellow seals, specially designed for high temperature application and suitable for high start-up torque since the bellows unit is independent of torque transmission. Grafoil is used as a secondary member having excellent temperature range up to 400°C.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Inconel 718
Secondary Seals	Graphite

Seal Characteristic

- Single Seal.
- Metal Bellow
- Balanced Seal
- Independent of direction of rotation

Applications

- General Chemicals.
- Petrochemicals
- Refineries

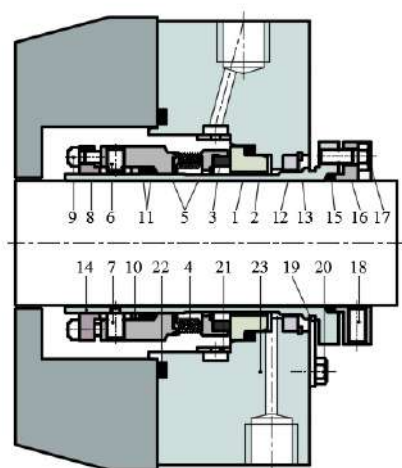
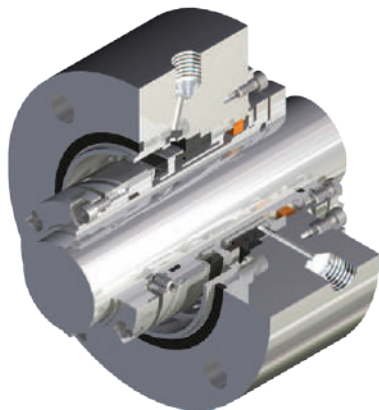
Components

- | | |
|-----------------------|--------------------|
| 1. Stationary Packing | 14. Bushing |
| 2. Stationary Face | 15. Cir Clip |
| 3. Rotary Insert | 16. Sleeve |
| 4. Bellows | 17. Sleeve Packing |
| 5. Retainer | 18. Collar Sleeve |
| 6. Set Screw | 19. Hex Head Bolt |
| 7. Set Screw | 20. Set Screw |
| 8. Collar Compression | 21. Setting Clip |
| 9. Cap Screw | 22. Hex Head Bolt |
| 10. Compression Ring | 23. Ring Deflector |
| 11. Rotary Packing | 24. Packing Gland |
| 12. Buffer Ring | 25. Gland |
| 13. Cir Clip | |

Performance Range

Shaft Diameter	20 ~ 100mm
Pressure	20 bar
Temperature	-60 ~ 400 °C
Velocity	35 m/sec

RMBS HT-16 SC – Cartridge Single Seal



Series of Rotating Metal Bellow seals, specially designed for high temperature application and suitable for high start-up torque since the bellows unit is independent of torque transmission. Grafoil is used as a secondary member having excellent temperature range up to 400°C.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Inconel 718
Secondary Seals	Elastomers

Seal Characteristic

- Single Seal.
- Metal Bellow
- Balanced Seal
- Independent of direction of rotation

Applications

- General Chemicals.
- Petrochemicals
- Refineries

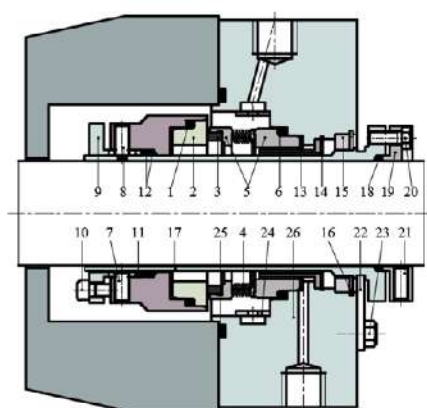
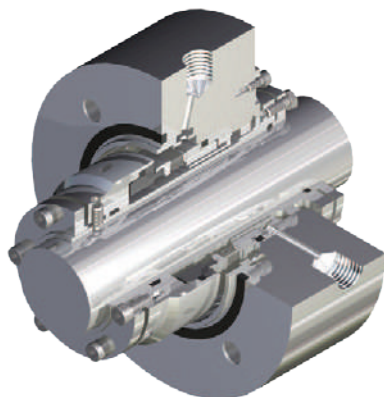
Components

- | | |
|----------------------------|--------------------|
| 1. Stationary Packing | 14. Sleeve |
| 2. Stationary Face | 15. Sleeve Packing |
| 3. Rotary Insert | 16. Collar Sleeve |
| 4. Bellows | 17. Hex Head Bolt |
| 5. Retainer | 18. Set Screw |
| 6. Set Screw | 19. Setting Clip |
| 7. Set Screw | 20. Hex Head Bolt |
| 8. Collar Compression Ring | 21. Ring Deflector |
| 9. Cap Screw | 22. Packing Gland |
| 10. Compression Ring | 23. Gland |
| 11. Rotary Packing | |
| 12. Bushing | |
| 13. Cir Clip | |

Performance Range

Shaft Diameter	20 ~ 100mm
Pressure	20 bar
Temperature	-60 ~ 400 °C
Velocity	35 m/sec

SMBS HT-14 SC – Single Cartridge Seal



Series of Stationary Metal Bellow design, specially designed for high temperature application. As a standard, Inconel 718 bellows cores. Grafoil is used as a secondary member having excellent temperature range up to 400°C.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Inconel 718
Secondary Seals	Graphite

Seal Characteristic

- Single Seal.
- Metal Bellow
- Balanced Seal
- Independent of direction of rotation

Applications

- General Chemicals.
- Petrochemicals
- Refineries

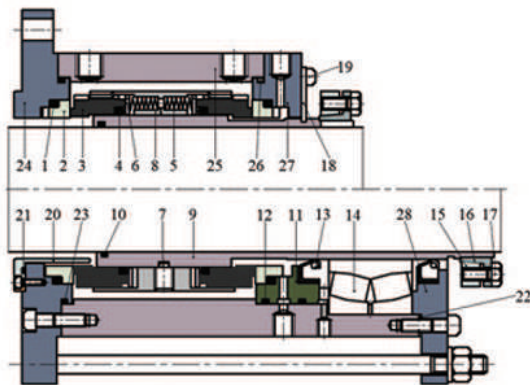
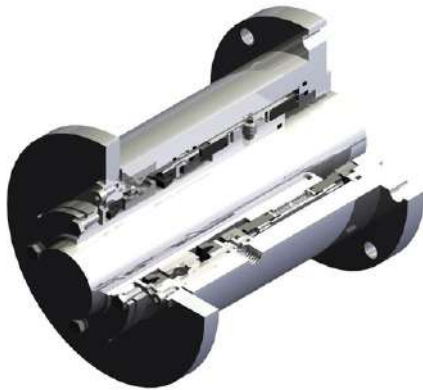
Components

1. Rotary Packing	14. Cir Clip
2. Rotary Face	15. Bushing
3. Stationary Insert	16. Cir Clip
4. Bellows	17. Sleeve
5. Retainer	18. Sleeve Packing
6. Stationary Packing	19. Collar Sleeve
7. Set Screw	20. Hex Head Bolt
8. Set Screw	21. Set Screw
9. Collar Compresi	22. Setting Clip
10. Cap Screw	23. Hex Head Bolt
11. Compretion Ring	24. Ring Deflexor
12. Packing Hook Sleeve	25. Packing Gland
13. Buffer Ring	26. Gland

Performance Range

Shaft Diameter	25 ~ 100mm
Pressure	20 bar
Temperature	-60 ~ 400 °C
Velocity	35 m/sec

Mixer, Agitator – RMS U-11 or B-13 DC – Dual Cartridge Seal



Multi spring type, are designed for heavy duty service involving high pressure and sliding velocities. This seal has positive drive arrangement. The seal is supplied as a cartridge unit and can be directly bolted to stuffing box. Seal face geometry enables use of face to back configuration which is preferred in many dual seal application.

Materials

Seal Face	Carbon, SiC, TC
Metal Parts	SS 316, Hastelloy C
Secondary Seals	Elastomers

Seal Characteristic

- Single or Dual Seal
- Balanced Seal or Unbalance Seal
- Multi-Spring Type
- Independent of direction of rotation.
- Standard API 682 Arrangement 3 Type A for pressurized barrier configurations.

Applications

Working with the use of coolant and buffer fluid and applied in cases of aggressive and hazardous media

Components

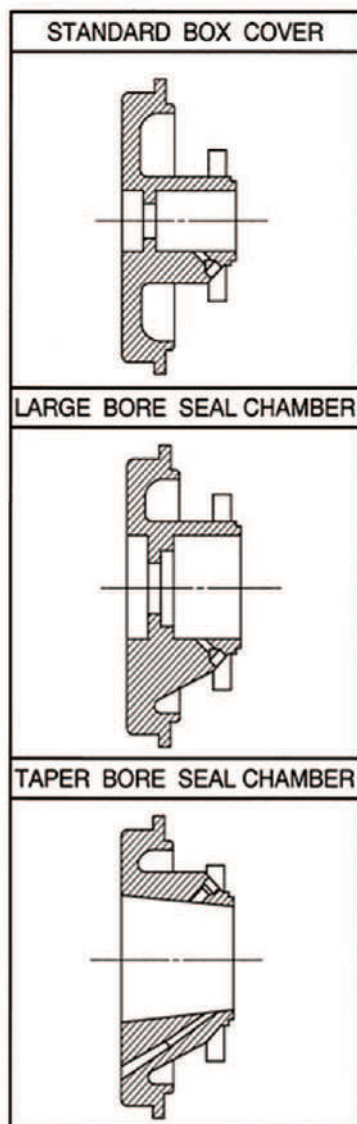
- | | |
|--------------------------------|-----------------------|
| 1. Stationary Packing | 15. Collar Sleeve |
| 2. Stationary Face | 16. Collar Compressi |
| 3. Rotary Face | 17. Hex Head Bolt |
| 4. Rotary Packing | 18. Setting Clip |
| 5. Spring | 19. Cap Screw |
| 6. Backup Ring | 20. Buffer Ring |
| 7. Set Screw | 21. Cap Screw |
| 8. Drive Collar | 22. Cap Screw |
| 9. Sleeve | 23. Auxiliary Packing |
| 10. Sleeve Packing | 24. Auxiliary Gland |
| 11. Stationary Housing | 25. Gland |
| 12. Packing Stationary Housing | 26. Packing Gland |
| 13. Oil Seal | 27. Gland |
| 14. Bearing | 28. Cover Bearing |

Performance Range

Shaft Diameter	50 ~ 150mm
Pressure	Up to 8 bar [max]
Temperature	-5 ~ 180 °C
Velocity	5 m/sec

Seal Chamber

ANSI Box Cover / Seal Chambers



The Peerless Model 8196 ANSI pumps are available with three different box cover/seal chamber arrangements: **STANDARD**, **LARGE BORE** and **TAPER BORE**.

STANDARD BOX COVER - The standard box cover is primarily used with packing or non-trouble-some mechanical seal applications.

LARGE BORE SEAL CHAMBER - The large bore seal chamber is used with mechanical seals only. The advantages of this box cover are:

1. It effectively lubricates and cools the seals.
2. The large bore will accommodate more seals, such as larger, more complex seals that can provide better sealing.
3. It helps keep solids away from components and provides more area for liquid circulation and heat dissipation.

The results are longer seal life and reduced maintenance

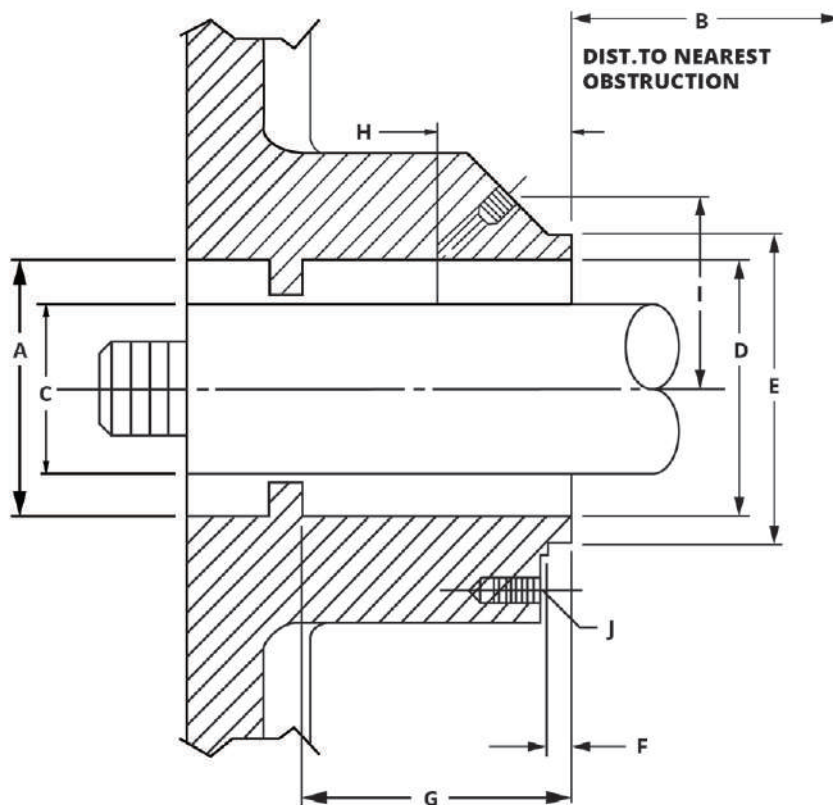
Seal Face	Carbon, SiC, Tung. Carbide
Metal Parts	SS 316, Hastelloy C, Alloy 20
O-ring	Elastomers

TAPER BORE SEAL CHAMBER - The taper bore seal chamber is used with mechanical seals where solid build-up is a problem. It has a large tapered bore and an internal bypass which circulates the pumping liquid. This lubricates, cools and cleans the seal chamber. The results are longer seal life, no solid build-up, and less maintenance.

ALL THREE BOX COVER :

1. Are completely interchangeable.
2. Can use standard mechanical seals.
3. Are available in 316SS, 317SS, Alloy 20, CD4, and more

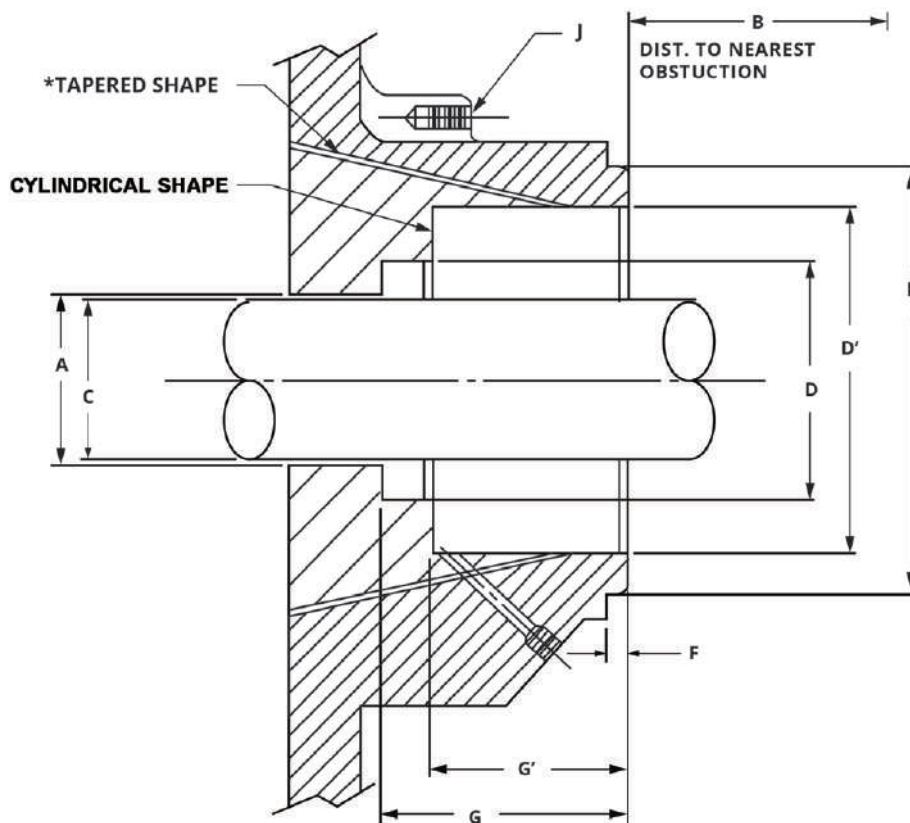
Seal Chamber Peerless ANSI Pump Standard Stuffing Box Cover



PUMP SIZE	BOX COVER									J			BOX CVR NPT	GLD NPT
	A	B	C	D	E	F	G	H	I	STUDS		BOLT HOLE CIR.		
										SIZE	NO			
8196 ST	1.400 1.405	2.19	1.375 1.375	1.999 2.003	2.392 2.395	.19	2.12	.97	1.81	.375	4	3.25	.25	.25
8196 MT	1.770 1.780	2.81	1.748 1.750	2.499 2.503	3.017 3.020	.25	2.62	1.56	2.50	.500	4	4.12	.38	.50
8196 LTC	2.145 2.155	2.81	2.123 2.125	2.874 2.878	3.517 3.520	.25	2.62	1.56	2.63	.500	4	4.50	.38	.50
8196 XLT	2.520 2.530	2.85	2.498 2.500	3.374 3.376	4.371 4.374	.25	3.00	1.81	3.50	.625	4	5.38	.38	.50

Seal Chamber Peerless ANSI Pump

ANSI Seal Chamber Box Cover - Large /Taper Bore



PUMP SIZE	BOX COVER									J			BOX CVR NPT	GLD NPT
	A	B	C	D	D ¹	E	F	G	G ¹	STUDS		BOLT HOLE CIR.		
										SIZE	NO			
8196 ST	1.400 1.405	2.19	1.375 1.375	1.999 2.003	2.88	3.594 3.597	.19	2.12	1.69	.375	4	4.50	.25	.25
8196 MT	1.770 1.780	2.81	1.748 1.750	2.499 2.503	3.50	4.337 4.340	.25	2.62	2.12	.500	4	5.50	.38	.50
8196 LTC	2.145 2.155	2.81	2.123 2.125	2.874 2.878	3.88	4.708 4.711	.25	2.62	2.12	.500	4	6.00	.38	.50
8196 XLT	2.520 2.530	2.85	2.498 2.500	3.374 3.376	4.50	5.447 5.450	.25	3.00	2.50	.625	4	6.75	.38	.50

Metal Required Corrosive Service Application

Corrosive Data

This guide is intended to match metal/alloy to the required corrosive service application. Actual rates of corrosion may vary significantly based upon temperature, trace elements, concentration or solid abrasives. A blank indicates no accurate data under those conditions for the specified metal and/or alloy.

This guide applies only to those metals/alloys readily available from Peerless Pump. Additional information can be obtained from the Indianapolis factory as needed

Use Index

A - Fully Satisfactory
B - Useful Resistance
C - Limited Use
X - Unsuitable
BLANK - Data Unavailable

Metal/Alloy Designation Index

316SS - Stainless Steel. ASTM A296 Gr Cf-8M, Aisi316
Alloy 20 - Carpenter stainless No. 20. ASTM A296 Gr CN-7M
CD4MCU - Stainless Steel. ACICO-4MCU
MON - Monel Grade E. ASTM A296 Gr M-35
Ni - Nickel. ASTM A296 Gr CZ-100
H-B - Hastelloy Alloy-B. ASTM A494
H-C - Hastelloy Alloy-C. ASTM A494
Ti - Titanium Unalloyed. ASTM B367 Gr C-1
Zi - Zirconium

Corrosive	Steel C.I. D.I.	Brz	316SS	A-20	CD4- MCu	Mon	Ni	H-B	H-C	Ti	Zi
Acetaldehyd, 70° F	B	A	A	A	A	A	A		A	A	A
Acetic Acid, 70° oF	X	A	A	A	A	B	B	A	A	A	A
Acetic Acid, <50%, To Boiling	X	B	A	A	B	B	B	C	A	A	A
Acetic Acid, >50%, To Boiling	X	X	B	A	C	B	B	X	A	A	A
Acetone, To Boiling	A	A	A	A	A	A	A	A	A	A	A
Alumunium Chloride, <10%, 70° F	X	B	C	B	C	B	C	A		B	A
Alumunium Chloride, >10%, 70° F	X	X	C	B	C	C	X	A		B	A
Alumunium Chloride, <10%, To Boiling	X	X	X	C	X	X	X	A		X	A
Alumunium Chloride, >10%, To Boiling	X	X	X	X	X	X	X	A	X	X	A
Alumunium Sulphate, 70° F	X	B	A	A	A	B	B	B	B	A	A
Alumunium Sulphate, <10%, To Boiling	X	B	B	A	B	X	X	A	A	A	A
Alumunium Sulphate, >10%, To Boiling	X	C	C	B	C	X	X	B	B	C	B
Ammonium Chloride, 70° F	X	X	B	B	B	B	B		A	A	A
Ammonium Chloride, <10%, To Boiling	X	X	B	B	C	B	B	B	A	A	A
Ammonium Chloride, >10%, To Boiling	X	X	X	C	X	C	C		C	C	C
Ammonium Fluosilicate, 70° F	X	X	C	B	C	X	X		C	X	X
Ammonium Sulphate, <40%, To Boiling	X	X	B	B	C	B	B	X	B	A	A
Arsenic Acid, to 225° F	X	X	C	B	C	X	X				
Barium Chloride, 70° F < 30%	X	B	C	B	C	B	B	B	B	B	B
Barium Chloride, <5%, To Boiling	X	B	C	B	C	B	B	B	B	A	A
Barium Chloride, >5%, To Boiling	X	C	X	C	X	C	C	C	C	C	C
Barium Hydroxide, 70° F	B	X	A	A	A	B	A	B	B	A	A
Barium Nitrate, To Boiling	C	X	B	B	B		B	B		B	B
Barium Sulphide, 70° F	C	X	B	B	B	X	X			A	A
Benzoid Acid	X	C	B	B	B	B	B	A	A	A	A
Boric Acid, To Boiling	X	C	B	B	B	C	C	A	A	B	B
Boron Trichloride, 70° F. Dry	B	B	B	B	B	B	B	B	B		
Boron Trifluoride, 70° F. 10% Dry	B	B	B	A	B	A	A		A		
Brine [acid], 70° F	X	X	X	X	X				B	B	
Bromine [dry], 70° F	X	X	X	X	X	X	C	B	B	X	X
Bromine [wet], 70° F	X	X	X	X	X	X	C		B	X	X
Calcium Bisulphite, 70° F	X	X	B	B	B	X	X		B	A	A
Calcium Bisulphite, To Hot	X	X	C	B	C	X	X		C	A	A
Calcium Chloride, 70° F	B	C	B	B	B	B	B	A	A	A	A
Calcium Chloride, <5%, To Boiling	C	C	B	B	B	A	A	A	A	A	A
Calcium Chloride, >5%, To Boiling	X	C	C	B	C	C	C	A	A	B	B
Calcium Hydroxide, 70° F	B	B	B	B	B	B	B		A	A	
Calcium Hydroxide, <30%, To Boiling	C	B	B	B	B	B	B		A	A	

Corrosive	Steel C.I. D.I.	Brz	316SS	A-20	CD4- MCu	Mon	Ni	H-B	H-C	Ti	Zi
Calcium Hydroxide, >30%, To Boiling	X	X	C	C	C	C	C		B	A	
Calcium Hypochlorite, <2%, 70° F	X	X	X	C	X	X	X		A	A	
Calcium Hypochlorite, >2%, 70° F	X	X	X	C	X	X	X		B	A	A
Carbolic Acid, 70° F. [phenol]	C	B	A	A	A	A	A	A	A	A	A
Carbon Bisulphide, 70° F	B	B	A	A	A	B	B			A	
Carbonic Acid, 70° F	B	C	A	A	A	C	B	A	A	A	A
Carbon Tetrachloride, Dry to Boiling	B	B	A	A	A	A	A	B	B	A	A
Chloric Acid , 70° F	X	X	X	B	C	X	X	X	C		
Chlorinated Water, 70° F	C	C	B	B	B				A	A	A
Chloracetic Acid, 70° F	X		X	X						A	B
Chlorsulphonic Acid, 70° F	X	X	X	C	X	X	X	A	A	B	X
Chromic Acid, <30%	X	X	C	B	C	X	X		B	A	A
Citric Acid	X	C	A	A	A	C	C	A	A	A	A
Copper Nitrate, to 175° F	X	X	B	B	B	X	X	X	X	B	
Copper Sulphate, To Boiling	X	C	C	B	C	X	X		A	A	A
Cresylic Acid	C	C	B	B	B	C	C	B	B		
Cupric Chloride	X	C	X	X	X	C	X		C	B	X
Cyanohydrin, 70° F	C		B	B	B						
Dichloroethane	C	B	B	B	B	C	B	B	B	A	B
Diethylene Glycol, 70° F	A	B	A	A	A	B	B	B	B	A	A
Dinitrochlorobenzene, 70° F [dry]	C	B	A	A	A	A	A	A	A	A	A
Ethanolamine , 70° F	B	X	B	B	B	C	X			A	A
Ethers , 70° F	B	B	B	A	B	B	B	B	B	A	A
Ethyl Alcohol, To Boiling	A	A	A	A	A	A	A	A	A	A	A
Ethyl Cellulose, 70° F	A	B	B	B	B	B	B	B	B	A	A
Ethyl Chloride , 70° F	C	B	B	A	B	B	B	B	B	A	A
Ethyl Mercaptan , 70° F	C	X	B	A	B			B	B		
Ethyl Sulphate , 70° F	C	B	B	A	B						
Ethylene Chlorohydrin , 70° F	C	B	B	B	B	B	B	B	B	A	A
Ethylene Dichloride , 70° F	C	B	B	B	B	B	B	B	C	A	A
Ethylene Glycol , 70° F	B	B	B	B	B	B	B	A	A	A	A
Ethylene Oxide , 70° F	C	X	B	B	B	B	B	A	A	A	A
Ferric Chloride, <5% , 70° F	X	X	X	X	X	X	X	X	A	A	B
Ferric Chloride, >5% , 70° F	X	X	X	X	X	X	X	X	B	B	X
Ferric Nitrate , 70° F	X	X	B	A	B	X	X		B		
Ferric Sulphate , 70° F	X	X	C	B	C	C	C		B	B	B
Ferous Sulphate , 70° F	X	C	C	B	C	C	C	B	B	A	A
Formaldehyde, To Boiling	B	B	A	A	A	B	B	B	B	A	A
Formic Acid , 212° F	X	C	X	A	B	C	C	A	A	C	A
Freon , 70° F	A	A	A	A	A	A	A	A	A	A	A
Hydrochloric Acid, <1% , 70° F	X	X	C	B	C	B	B	B	A	B	A
Hydrochloric Acid, 1-20% , 70° F	X	X	X	X	X	X	X	C	B	X	A
Hydrochloric Acid, > 20% , 70° F	X	X	X	X		X	X	C	B	X	B
Hydrochloric Acid, < 1/2% , 175° F	X	X	C	C	C	X	X	B	A	X	A
Hydrochloric Acid, 1/2-2 % , 175° F	X	X	X		X	X	X	B	B	X	A
Hydrochloric Acid, 70° F	X	X	C	B	C	C	C	C	C		
Hydrogen Peroxide, <30% < 150° F	C	X	B	B	B	B	B	B	B	A	A
Hydrofluoric Acid, <20%, 70° F	X	B	X	B	C	C	C	C	B	X	X
Hydrofluoric Acid, >20%, 70° F	X	C	X	C	X	C	C	C	B	X	X
Hydrofluoric Acid, To Boiling	X	X	X	X	X	C	X		C	X	X
Hydrofluorisilicic Acid, 70° F	X		C	B	C				B		
Lactic Acid, <50% , 70° F	X	B	A	A	A	X	C	B	B	A	A
Lactic Acid, >50% , 70° F	X	B	B	B	B	C	C	B	B	A	A
Lactic Acid, <5% , To Boiling	X	X	C	B	C	X	X	B	B	A	A
Lime Slurries, 70° F	B	B	B	B	A	B	B	B	B	B	B
Magnesium Chloride, 70° F	C	C	B	A	B	C	C	A	A	A	A
Magnesium Chloride, <5%, To Boiling	X	C	C	B	C	C	C	A	A	A	A
Magnesium Chloride, >5%, To Boiling	X	C	X	C	X	C	C	B	B	B	B
Magnesium Hydroxide, 70° F	B	A	B	B	A	B	A	B	B	A	
Magnesium Sulphate	C	C	B	A	B	B	B	C	C	B	B
Maleic Acid	C	C	B	B	B	C	C	B	B	A	
Mercaptans	A	X	A	A	A	X	X				
Mercuric Chloride, <2%, 70° F	X	X	X	X	X	X	C		B	A	A
Mercurous Nitrate, 70° F	C	X	B	B	B	C			C		
Methyl Alcohol, 70° F	A	A	A	A	A	A	A	A	A	A	A

Corrosive	Steel C.I. D.I.	Brz	316SS	A-20	CD4- MCu	Mon	Ni	H-B	H-C	Ti	Zi
Naphthalene Sulphonic Acid, 70° F	X	C	B	B	B	C	C	B	B		
Naphthalenic Acid, To Hot	C	C	B	B	B	C	C	B	B		
Nickel Chloride, 70° F	X	X	C	B	C	C	X	A		B	B
Nickel Sulphate	X	C	B	B	B	C	C		B		A
Nitric Acid	X	X	B	B	B	X	X			B	B
Nitrobenzene, 70° F	A	C	A	A	A	B	B	B	B	A	
Nitroethane, 70° F	A	A	A	A	A	A	A	A	A	A	A
Nitropropane, 70° F	A	A	A	A	A	A	A	A	A	A	A
Nitrous Acid, 70° F	X	X	X	C	X	X	X				
Nitrous Oxide, 70° F	C	C	C	C	C	X	X		C		
Oleic Acid	C	C	B	B	B	C	C	C	C	C	C
Oleum, 70° F	B	X	B	B	B	X	X	B	B	B	
Oxalic Acid	X	C	C	B	C	C	C	B	B	X	A
Palmitic Acid	B	B	B	A	B	B	B				
Phenol [see carbolic acid]											
Phosgene, 70° F	C	C	B	B	B	C	C	B	B		
Phosphoric Acid, <10%, 70° F	X	C	A	A	A	C	C	A	A	A	A
Phosphoric Acid, >10%, 70° F	X	C	A	A	A	C	C	B	C	B	B
Phosphoric Acid, <20%, 175° F	X	C	B	B	B	C	C	A	A	C	B
Phosphoric Acid, >20%, 175° F <85%	X	C	C	B	C	C	C	B	C	C	C
Phosphoric Acid, >10%, Boil, <85%	X	C	X	C	C	C	C	C	C	C	C
Phthalic Acid, 70° F	C	B	B	A	B	B	B	B	B	A	A
Phthalic Anhydride, 70° F	B	C	A	A	A	A	A	A	A		
Picric Acid, 70° F	X	X	C	B	C	C	X		B		
Potassium Carbonate	B	B	A	A	A	B	B	B	B	A	A
Potassium Chlorate	B	C	A	A	A	C	C		B	A	A
Potassium Chloride, 70° F	C	C	B	A	B	B	B	B	B	A	A
Potassium Cyanide, 70° F	B	X	B	B	B	C	C	B	B		
Potassium Dichromate	B	B	A	A	A	B	B		B	A	A
Potassium Ferrocyanide	C	B	B	B	B	B	B	B	B	A	A
Potassium Ferrocyanide, 70° F	X	B	B	B	B	B	B	B	B		B
Potassium Hydroxide, 70° F	C	C	B	A	B	A	A	B	C	B	A
Potassium Hypochlorite	X	C	C	B	C	X	X		B	A	
Potassium Iodide, 70° F	C	B	B	B	B	B	B	B	B	A	A
Potassium Permanganate	B	B	B	B	B	C	B		B		
Potassium Phosphate	C	C	B	B	B					B	B
Sea Water, 70° F	C	B	B	A	B	A	A	A	A	A	A
Sodium Bisulphate, 70° F	X	C	C	B	C	C	C	B	B	B	A
Sodium Bromide, 70° F	B	C	B	B	B	B	B	B	B		
Sodium Carbonate	B	B	B	A	B	B	B	B	B	A	A
Sodium Chloride, 70° F	C	B	B	B	B	A	A	B	B	A	A
Sodium Cyanide											
Sodium Dichromate											
Sodium Ethylate											
Sodium Fluoride											
Sodium Hydroxide, 70° F	B	B	B	A	B	A	A				
Sodium Hypochlorite	X	X	C	C	C	X	X				
Sodium Lactate, 70° F	B	C	C	C	C	C					
Stannic Chloride, <5%, 70° F	X	C	X	C	X	C	C				
Stannic Chloride, >5%, 70° F	X	X	X	X	X	X	X				
Sulphite Liquors, To 175° F	X	C	B	B	B	C	C				
Sulphur [molten]	B	X	A	A	A	C	C				
Sulphur Dioxide [spray], 70° F	C	C	B	B	B	C	C				
Sulphuric Acid, <2%, 70° C	X	C	B	A	B	C	C				
Sulphuric Acid, 2-40%, 70° C	X	C	C	B	C	C	C				
Sulphuric Acid, 40%, <90%, 70° C	X	X	X	B	X	X	X				
Sulphuric Acid, 93-96%, 70° C	B	X	B	B	B	X	X				
Sulphuric Acid, <10%, 175° C	X	C	X	B	X	X	X				
Sulphuric Acid, <10-60% & >80%, 175° C	X	X	X	B	X	X	X				
Sulphuric Acid, <60-80%, 175° C	X	X	X	X	X	X	X				
Sulphuric Acid, <3/4%, Boiling	X	X	C	B	C	X	X				
Sulphuric Acid, 3/4-40%, Boiling	X	X	X	C	X	X	X				
Sulphuric Acid, 40-65%, & >85%, Boil	X	X	X	X	X	X	X				
Sulphuric Acid, 65-85%, Boiling	X	X	X	X	X	X	X				
Sulphurous Acid, 70° F	X	C	C	B	C	X	X				

Corrosive	Steel C.I. D.I.	Brz	316SS	A-20	CD4- MCu	Mon	Ni	H-B	H-C	Ti	Zi
Titanium Tetrachloride, 70° F	C		C	B	C	C			C		
Tirchlorethylene, To Boiling	B	C	B	B	B	B	B	B	B	A	A
Urea, 70° F	C	C	B	B	B	C	C	C	C	B	B
Vinyl Acetate	B	B	B	B	B				B		
Vinyl Chloride	B	C	B	B	B	C	C	C	B	A	
Water, To Boiling	B	A	A	A	A	A	A	A	A	A	A
Zinc Chloride	C	C	B	A	B	B	B	B		A	A
Zinc Cyanide, 70° F	X	B	B	B	B	B	B	B	B	B	B
Zinc Sulphate	X	C	A	A	A	C	C	C	C	A	

Elastomer Chemical Compatibility

Product	Conditions		Metal Components			Face Materials						Secondary Seals							Comments
	°C	%	316 SS	200b-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SIC-RB	SIC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM	FFKM	
Acetaldehyde	<93		A	A	A	A	A	A	A	A	A	X	A	X	X	A	X	A	Flammable
Acetate Solvents			A	A	A	A	A	A	A	A	A	X	X			A	X	A	
Acetic Anhydride	<93		A	C	A	A	A	A	X	A	A	X	X	X	X	A	X	A	
Acetic Acid	<93	<5	A	A	A	A	A	A	X	A	A	X	A	A	B	A	A	A	Acid Grade Carbon
Acetic Acid	<93	<40	A	A	A	A	A	A	X	A	A	X	A	X	X	A	X	A	Acid Grade Carbon
Acetic Acid	<93	>40	C	C	A	A	A	A	X	A	A	X	X	X	X	A	X	A	Acid Grade Carbon
Acetic Acid, Glacial	<121	100	C	C	A	A	A	A	X	A	A	X	X	X	X	A	X	A	Acid Grade Carbon
Acetic Acid Vapors			C	C	A	A	A	A	X	A	A	X	A			A	X	A	Acid Grade Carbon
Acetone	<93		A	A	A	A	A	A	A	A	A	X	A	X	X	A	X	A	Flammable
Acetylene	<121		A	A	A	A	A	A	A	A	A	B	B	A	X	A	A	A	Flammable
Acrylic Acid	<66		A	A	A	A	A	A	A	A	A	X	X	X	X	A	A	A	
Acrylonitrile	<93		C	C	A	C	A	A	A	A	A	X	X	X	X	A	X	A	Explosive, Toxic
Adipic Acid	<66		C	C	A	A	A	A	X	X	A	A	A	X	X	A	A	A	Melting Point 152 C
Allyl Alcohol	<93		A	A	A	A	A	A	A	A	A	B	A			A	A	A	
Allyl Chloride	<93		C	C	C	A	A	X	A	A	A	X	X	X	B	A	A	A	
Allum Solution	<21	<10	C	A	C	A	A	A	X	A	A	A	A	X	A	A	A	A	
Allum Solution	<21	>10	C	C	C	A	A	X	X	A	A	A	A	X	A	A	A	A	
Aluminum Chloride	<93		X	X	A	C	A	A	X	X	A	B	A	A	B	A	A	A	
Aluminum Sulfate	<93	<50	X	A	A	A	A	A	X	A	A	B	A	A	B	A	A	A	
Amine Service	<93		A	A	A	A	A	A	X	A	A	X	X			A	X	A	
Amino Benzene Sulfuric Acid	<93		C	C	C	A	A	X	X	A	A	X	X	X	X	A	X	A	
Amino Benzoic Acid	<93		C	C	C	A	A	X	X	A	A	X	X		X	A	X	A	
Ammonia, Anhyrous	<149		A	A	A	C	A	A	A	X	A	X	B	X	B	A	X	A	Explosive in Air
Ammonia, Aqua	<93		C	C	C	A	A	X	A	X	A	X	A	X	B	A	X	A	
Ammonium Bifluoride	<66		X	C	C	A	X	X	X	A	A	A	A			A	A	A	
Ammonium Carbamate	<93		C	C	C	A	A	X	A	A	A	X	A	X	A	A	X	A	
Ammonium Carbonate	<93		C	C	C	A	A	X	X	A	A	X		A	B	A	A	A	
Ammonium Hydroxide [Conc.]	<93		C	C	C	C	A	X	A	X	A	X	A	X	B	A	X	A	
Ammonium Nitrate	<93		A	A	C	A	A	A	X	A	A	B	A	X	B	A	A	A	Explosive
Ammonium Phosphate	<93	<40	C	C	C	A	A	X	X	A	A	B	A	X	B	A	X	A	
Ammonium Stearate			A	A	A	A	A	A	A	A	A					A		A	
Ammonium Sulfate	<93		C	C	C	A	A	X	X	A	A	B	A	X	B	A	X	A	
Amyl Alcohol	<93		A	A	A	A	A	A	A	A	A	X	A	A	X	A	X	A	Toxic
Aniline	<204		A	A	C	A	A	A	X	A	A	A							
Aniline Dyes	<204		A	A	C	A	A	A	X	A	A	X	X	X	X	A	X	A	
Aqua Regia	<66		X	X	X	X	A	X	X	X	A	X	X		X	A	X	A	
Aroclor 1248			A	A	A	A	A	A	A	A	A	X	X	A	X	A	A	A	
Arsenic Acid	<93		C	C	C	C	A	X	X	X	A	B	A	A	B	A	A	A	Toxic
Arsenic Trioxide	<93		C	C	C	A	A	X	X	A	A	B	X		B	A	X	A	Toxic
Ascorbic Acid	<21		A	A	A	A	A	A	A	A	A	X	X		A	A	X	A	
Asphalt, Emulsified			A	A	A	A	A	A	A	A	A	X	X	X	X	A	A	A	

Product	Conditions		Metal Components			Face Materials						Secondary Seals						Comments	
	°C	%	316 SS	20Cb-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SiC-RB	SiC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM		FFKM
Barium Chloride	<93	<60	C	C	A	A	A	X	X	A	A	B	A	A	B	A	A	A	Toxic
Barium Hydroxide	<93	<40	A	A	C	C	A	A	A	A	A	B	A	A	B	A	A	A	Toxic
Barium Nitrate	<93	<50	C	C	C	A	A	X	X	A	A	X	A		B	A	X	A	Toxic
Barium Sulfate	<93	<10	C	C	C	A	A	X	X	A	A	B	A	A	B	A	A	A	
Beer			A	A	A	C	A	X	A	A	A	C	C	C	C	C	C	C	Food Grade Mat'l
Benzene, Benzol	<93		C	A	A	A	A	A	A	A	A	X	X	X	X	A	A	A	
Benzene Sulfonic Acid	<21		C	A	C	C	A	A	X	X	A	X	X	X	X	A	A	A	Acid Grade Carbon
Benzoic Acid	<93		C	C	A	A	A	A	X	A	A	X	X	X	X	A	A	A	
Black Liquor, Sulfate			C	C	A	C	A	A	A	X	A	X	A	A	A	A	A	A	
Boiler Feed Water			C	A	A	A	A	A	A	A	A	A	A	A		A	A	A	Avoid Copper
Bonderite Solution			A			A	A	A	A	A	A	A				A	A	A	
Borated Water	<149	<5	A	A	A	A	A	A	A	X	A	X	C	C	C	X	X	C	Nuclear Rated Mat'l
Borated Water	<149	>5	C	C	A	A	A	A	A	X	A	X	C	C	C	X	X	C	Nuclear Rated Mat'l
Boric Acid	<149	<50	C	C	A	A	A	A	X	X	A	B	B	A	B	A	A	A	
Brine	<93		X	C	A	A	A	A	A	A	A	B	A			A	A	A	
Bromine [dry]	<66	100	X	X	A	X	A	X	A	X	A	X	X	X	X	A	A	A	
Bromine [wet]	<93		X	X	X	X	A	X	X	X	A	X	X	X	X	A	A	A	
Bunker C Fuel Oil			A	A	A	A	A	A	A	A	A	A	X	X	X	A	A	A	Flammable
Butadiene [Monomer]	<93		A	A	A	A	A	A	A	A	A	X	X	X	X	A	A	A	Flammable
Butane	<149		A	A	A	A	A	A	A	A	A	B	X	X	B	A	A	A	Flammable
Butyl Acetate	<149		A	A	A	C	A	A	A	A	A	X	X		X	A	X	A	
Butyl Alcohol	<93		A	A	A	A	A	A	X	A	A	B	X	A	B	A	A	A	
Butyraldehyde	<93		A	A	A	A	A	A	A	A	A	X	X			A	X	A	Flammable
Butyric Acid	<93		C	C	A	A	A	X	X	X	A	X	X	A	X	A	X	A	
Calcium Bisulfite	<121		A	A	A	A	A	A	X	X	A	X	X	A	X	A	A	A	
Calcium Carbonate	<93		A	C	C	A	A	A	A	X	A	B	A	A	B	A	A	A	
Calcium Chloride	<93		X	C	A	C	A	A	A	X	A	B	A	A	B	A	A	A	
Calcium Hydroxide	<93	<50	C	C	A	C	A	A	A	X	A	B	A	A	B	A	A	A	
Calcium Hypochlorite	<21		X	C	C	C	A	A	X	A	A	X	A	A	X	A	A	A	
Calcium Nitrate	<93	<40	C	C	C	A	A	X	X	A	A	B	A	A	B	A	A	A	
Calcium Phosphate	<93	<10	C	C	C	A	A	X	X	A	A	B	A	A	B	A	A	A	
Calcium Stearate	<93	<10	C	C	C	A	A	X	X	A	A	X	X		X	A	A	A	
Calcium Sulfate	<93	<10	A	A	A	A	A	A	X	A	A	X	A		B	A	X	A	
Cane Sugar [Liquors]		<20	A	A	A	C	A	X	A	A	A	C	C	C	C	C	C	C	Food Grade Mat'l
Caprolactam			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	
Carbon Dioxide [gas]			A	A	A	A	A	A	A	A	A	A	X	A	A	A	A	A	
Carbon Dioxide [liquid]			A	A	A	A	A	A	A	A	A	A	X	A	A	A	A	A	
Carbonic Acid	<93	<10	A	A	A	A	A	A	X	A	A	X	A	A	B	A	A	A	
Carbon Monoxide			A	A	A	A	A	A	A	A	A	A	A	A	X	A	A	A	Toxic
Carbon Tetrachloride	<93	100	C	A	A	A	A	A	A	A	A	X	X	X	X	A	A	A	
Castor Oil			A	A	A	A	A	A	A	A	A	A	X	A	A	A	A	A	

Product	Conditions		Metal Components			Face Materials						Secondary Seals						Comments	
	°C	%	316 SS	20Cb-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SIC-RB	SIC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM		FFKM
Chlorine, Anhydrous	<52		C	A	A	X	A	A	X	A	A	X	X		X	A	X	A	Toxic
Chlorine [wet]	<52		X	X	C	A	A	X	X	A	A	X	X	X	X	A	X	A	
Chlorine Dioxide	<52		X	C	C	A	A	X	X	A	A	X	X	X	X	A	A	A	Toxic
Chloroacetic Acid	<66	<90	X	C	C	C	A	X	X	X	A	X	X	X	X	A	X	A	Acid Grade carbon
Chloroacetic Acid	<66	>90	X	C	A	C	A	A	X	X	A	X	X	X	X	A	X	A	Acid Grade carbon
Chlorobenzene	<66	<90	X	C	C	A	A	X	X	A	A	X	X	X	X	A	A	A	
Chlorobenzene	<66	>90	X	C	A	A	A	A	X	A	A	X	X	X	X	A	A	A	
Chloroform	<93		C	C	C	A	A	X	A	A	A	X	X	X	X	A	A	A	Flammable, Toxic
Chloroform	<21	100	A	A	A	A	A	A	A	A	A	X	X	X	X	A	A	A	Flammable, Toxic
Chloropicrin	<93	100	C	C	A	A	A	A	X	A	A	X	X		X	A	A	A	
Chlorosulfonic Acid	<93	>20	X	C	A	X	A	A	X	A	A	X	X	X	X	A	X	A	
Chromic Acid	<66	<20	X	X	A	C	A	X	X	A	A	X	X	A	X	A	A	A	Acid Grade Carbon
Citric Acid	<100	<50	A	C	A	A	A	A	X	A	A	B	A	A	B	A	A	A	
Citric Acid	<100	>50	X	C	A	A	A	A	X	A	A	B	A	A	B	A	A	A	
Clay Slurry			A	A	A	A	A	A	A	A	A	A	A			A	A	A	
Coal Tar [Creosote]			A	A	A	A	A	A	A	A	A	A	X			A	A	A	
Condensate	<121		A	A	A	A	A	A	A	A	A	B	A	A		A	A	A	Avoid Copper
Cooling Tower Water			A	A	A	A	A	A	A	A	A	A	A	A		A	A	A	
Copper Acetate	<93	<20	A	A	C	A	A	X	X	A	A	X	A		X	A	X	A	
Copper Acetate	<93	>20	C	C	C	A	A	X	X	A	A	X	A		X	A	X	A	
Copper Ammonia Acetate	<66		A	A	C	A	A	A	A	A	A	X	A	A	X	A	X	A	
Copper Chloride	<38		X	X	C	A	A	X	X	A	A	A	A	A	X	A	A	A	
Copper Cyanide	<71	<10	C	C	A	A	A	A	X	A	A	B	A	A	B	A	A	A	
Copper Cyanide	<93	>10	C	C	C	A	A	X	X	A	A	B	A	A	B	A	A	A	
Copper Nitrate	<93	<10	A	A	X	A	A	A	X	A	A	X	X	X	X	A	A	A	
Copper Nitrate	<93	>10	C	C	X	A	A	X	X	A	A	X	X	X	X	A	A	A	
Copper Sulfate	<93	<60	C	C	A	A	A	A	X	A	A	B	A	A	B	A	A	A	
Corn Oil			A	A	A	C	A	X	A	A	A	C	X	X	X	C	C	C	
Corn Syrup [glucose]			A	A	A	C	A	X	A	A	A	C	C	C	X	C	C	C	
Cotton Seed Oil			A	A	A	A	A	A	A	A	A	A	X	X	X	A	A	A	
Cresote	<93		C	C	A	A	A	X	X	A	A	B	X	X	X	A	A	A	
Cresylic Acid			C	C	C	A	A	X	X	A	A	X	X	X	X	A	A	A	
Crude Oil			A	A	A	A	A	A	A	A	A	A	X	X	X	A	A	A	
Cumene	<93		C	C	C	A	A	X	X	A	A	X	X	X	X	A	A	A	
Cutting Oil			A	A	A	A	A	A	A	A	A	A	X	X	X	A	A	A	
Cyclohexane	<93		C	C	C	A	A	X	A	A	A	B	X	X	X	A	A	A	
Cyclohexanol	<93		A	A	A	A	A	A	A	A	A	X	X	X	X	A	A	A	
Cyclohexanone	<93		C	C	C	A	A	X	A	A	A	X	X	X	X	A	X	A	
De-Butanizer Reflux			A	A	A	A	A	A	A	A	A	A	X			A	A	A	Flammable
De-Ethanizer Reflux			A	A	A	A	A	A	A	A	A	A	X			A	A	A	Flammable
De-Propanizer Reflux			A	A	A	A	A	A	A	A	A	A	X			A	A	A	Flammable

Product	Conditions		Metal Components			Face Materials						Secondary Seals							Comments
	°C	%	316SS	20Cb-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SIC-RB	SIC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM	FFKM	
Dextrose			A	A	A	C	A	X	A	A	A	X	C		C	C	X	C	Food Grade Mat'l
Diacetone Alcohol	<93		A	A	A	C	A	A	A	A	A	X	A	X	X	A	X	A	Flammable
Diatomaceous Earth [in water]			A	A	A	A	A	A	A	A	A	A	A		A	A	A	A	
Dibutylamine	<38		A	A	A	A	A	A	A	A	A	X	X			A	X	A	
Dibutyl Ether	<93		A	A	A	A	A	A	A	A	A	X	X	X	X	A	X	A	Flammable, Explosive
Dibutyl Phthalate	<100		A	A	A	A	A	A	A	A	A	X	X	X	X	A	X	A	
Dichlorobenzene	<93	100	C	C	A	A	A	A	X	A	A	X	X	X	X	A	A	A	
Dichloroethane	<21		C	C	C	A	A	X	A	A	A	X	X		X	A	A	A	
Dichloroethylene			C	C	C	A	A	X	X	A	A	X	X		X	A	A	A	
Dichlorohydrin	<93		C	C	C	A	A	X	X	A	A	X	A		B	A	X	A	
Diesel Fuel			A	A	A	A	A	A	A	A	A	A	X	X	X	A	A	A	Flammable
Diethanolamine [DEA]	<93		A	A	A	C	A	A	X	A	A	X	A		B	A	X	A	Flammable
Diethylamine	<93		A	A	A	A	A	A	X	A	A	X	X		X	A	X	A	Flammable
Diethyl Carbonate	<52		A	A	A	A	A	A	A	A	A	X	A		A	A	X	A	Flammable
Diethyl Ether	<93		A	A	A	A	A	A	A	A	A	X	X	X	X	A	X	A	Flammable, Explosive
Diethylene Glycol	<149		A	A	C	A	A	A	A	A	A	B	B	A	B	A	A	A	
Diethylene Triamine	<93		A	A	A	A	A	A	A	A	A	X	X		X	A	X	A	
Di-isobutyl Ketone	<93		A	A	A	A	A	A	A	A	A	X	A	A	X	A	X	A	
DI-isopropyl Ketone			A	A	A	A	A	A	A	A	A	X	A	X	X	A	X	A	
Dimethylamine	<93		A	A	A	A	A	A	A	A	A	X	X			A	X	A	
Dimethyl Formamide [DMF]	<204		A	A	A	A	A	A	A	A	A	X	X	X	X	A	X	A	
Dimethyl Hydrazine [UDMM]	<38		A		A	A	A	A	A	A	A	X	A		A	A	X	A	Avoid water/steam
Dimethyl Terephthalate [DMT]	<93		A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	
Dinitrochlorobenzene [DMCB]	<93		A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	
Diocetylamine	<93		A		A	A	A	A	A	A	A	X	X			A	X	A	
Diocetyl Phthalate	<93		A	A	A	A	A	A	A	A	A	X	X	X	X	A	X	A	
Diphenyl	<260		A	A		A	A	A	A	A	A	X	X	X	X	A	B	A	
Distilled Water			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Dow Corning Silicone Fluids			A	A	A	A	A	A	A	A	A	X	A	X	A	A	A	A	
Dowtherm A, G, H, LF	<204		A	A	A	A	A	A	A	A	A	X	X		X	A	B	A	
Dye liquors			A	A	A	A	A	A	A	A	A	X	X			A	A	A	
Epichlorohydrin	<93		C	A	A	A	A	A	A	A	A	X	X		X	A	X	A	
Epsom Salt		<40	A	A	A	A	A	A	A	A	A	A	A			A	A	A	
Ethane			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Ethanol [Ethyl Alcohol]	<93		A	A	A	A	A	A	A	A	A	X	A		B	A	X	A	Flammable
Ethanol [Fuel w/5% Gasoline]			A	A	A	A	A	A	A	A	A	X	X	X	X	A	C	A	Flammable
Ethanolamine [MEA]	<93		A	A	A	A	A	A	A	A	A	X	X	X	X	A	X	A	
Ethyl Acetate	<149		A	A	A	A	A	A	A	A	A	X	X		X	A	X	A	Explosive
Ethyl Benzene	<93		C	C	A	A	A	A	A	A	A	X	X	X	X	A	A	A	Flammable
Ethyl Bromide	<38		A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	Explosive
Ethyl Cellulose			C	C	C	A	A	X	X	A	A	X	X		X	A	X	A	

Product	Conditions		Metal Components			Face Materials						Secondary Seals						Comments	
	°C	%	316 SS	20Cb-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SIC-RB	SIC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM		FFKM
Ethyl Chloride		100	A	A	C	A	A	A	A	A	A	A	X		X	A	A	A	Explosive
Ethylene			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Ethylene Dichloride			C	C	C	A	A	X	X	A	A	X	X		X	A	A	A	Flammable
Ethylene Glycol	<149		A	A	A	A	A	A	A	A	A	B	B		B	A	A	A	
Ethylene Oxide	<93		C	C	A	A	A	A	A	A	A	X	X		X	A	X	A	Flammable
Ethylene Trichloride	<21		A	A		A	A	A	A	A	A	X	X		X	A	A	A	
Ethyl Ether			C	C	C	A	A	A	A	A	A	X	X		X	A	X	A	Explosive
Ethyl Sulfate			C	C	C	A	A	X	A	A	A	X	A	A	X	A	X	A	
Fatty Acid												X	X		X	A	A	A	See Specific Acid
Ferric Chloride	<52		X	C	C	A	A	X	X	X	A	A	A		X	A	A	A	Titanium wetted parts
Ferric Hydroxide	<79		C	C	C	A	A	X		A	A	X	A		A	A	X	A	
Ferric Nitrate	<52		C	A	C	A	A	A	X	A	A	A	A		A	A	A	A	
Ferric Sulfate	<52			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Ferrous Chloride	<79	<50	X	X	C	A	A	X	X	A	A	X	X	X	X	A	X	A	
Ferrous Sulfate	<79		X	C	C	A	A	X	X	A	A	X	A		A	A	X	A	
Fluosilicic Acid	<21		X	X	X	A	A	X	X	X	A	A	X	A	A	A	A	A	Use Alloy 400
Formaldehyde	<93		A	C	C	A	A	A	X	A	A	X	X	A	X	A	X	A	
Formamide	<93		C	C	C	A	A	X	X	X	A	X	A		B	A	X	A	
Formic Acid	<71	100	X	A	A	C	A	A	X	X	A	X	A	X	A	A	X	A	
Freon 11, 31, Oil			A	A	A	A	A	A	A	A	A	X	X			A	X	X	Check Elastomer Com- patibility with Oil Type and Oil Aniline Point
Freon 12, 112, Oil			A	A	A	A	A	A	A	A	A	X	X			A	A	X	
Freon 13, 12, 114, Oil			A	A	A	A	A	A	A	A	A	A	X			A	A	X	
Freon 21, 22, Oil			A	A	A	A	A	A	A	A	A	X	X			A	X	C	
Freon 32, Oil			A	A	A	A	A	A	A	A	A	A	X			A	X	C	
Freon 113, 115, Oil			A	A	A	A	A	A	A	A	A	A	X			A	X	X	
Fruit Juice			A	A	A	C	A	X	X	A	A	C	C			C	C	C	Food Grade Mat'l
Fuel Oil #6			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Furfural	<93	<20	A	A	C	A	A	A	X	A	A	X	X		X	A	X	A	
Furfural	<93	>20	C	C	C	A	A	X	X	A	A	X	X		X	A	X	A	
Furfuryl Alcohol	<93		A	A	A	A	A	A	A	A	A	X	X		X	A	X	A	
Gas Oil			A	A	A	A	A	A	A	A	A	A	X			A	A	A	Flammable
Gasoline w/20% MTBE			A	A	A	A	A	A	A	A	A	A	X			A	A	A	Flammable
Gelatin	<93		A	A	A	A	A	A	A	A	A	B	A		B	A	A	A	
Glacial Acetic Acid	<66		C	C	A	A	A	A	X	X	A	X	A	X	X	A	X	A	
Glaubers Salt [Sodium Sulfate]			A	A	C	A	A	X	X	X	A	X	X		X	A	A	A	
Glucose			A	A	A	C	A	X	A	A	A	C	C		X	C	C	C	Food Grade Mat'l
Glue			A	A	A	A	A	A	A	A	A	A	A		X	A	A	A	
Glue Sizing			A	A	A	A	A	A	A	A	A	A	X			A	X	A	

Product	Conditions		Metal Components			Face Materials						Secondary Seals							Comments
	°C	%	316 SS	20Cb-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SIC-RB	SIC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM	FFKM	
Glycerine [Glycerol]	<93		A	A	A	A	A	A	A	A	A	B	A	A	B	A	A	A	
Green Liquor, Sulfate			C	C	A	A	A	A	A	X	A	X	A		X	A	A	A	
Heat Transfer Fluids			A	A	A	A	A	A	A	A	A					A		A	See Specific Fluid
Heptane	<93		A	A	A	A	A	A	A	A	A	B	X		X	A	A	A	Flammable
Hexane	<93		A	A	A	A	A	A	A	A	A	B	X		X	A	A	A	Flammable
Hexanol	<93		A	A	A	A	A	A	A	A	A	B	X			A	A	A	Flammable
Hydrazine	<66		A	X	X	A	A	X	X	A	A	X	A		X	A	X	A	Flammable
Hydrobromic Acid	<93		X	X	A	A	A	X	X	A	A	X	A		X	A	A	A	
Hydrochloric Acid	<52	<2	X	X	C	A	A	X	X	A	A	X	A			A	A	A	Hastelloy B
Hydrochloric Acid	<21	<10	X	X	C	A	A	X	X	A	A	X	A	A	X	A	A	A	Hastelloy B
Hydrochloric Acid	<52	<37	X	X	C	A	A	X	X	A	A	X	X	X	X	A	A	A	Hastelloy B
Hydrocyanic Acid	<93		X	C	C	A	A	X	X	X	A	X	A		X	A	A	A	Toxic
Hydrofluoric Acid	<52		X	C	C	X	A	X	X	X	A	X	X	X	X	A	C	A	Acid Grade Carbon
Hydrogen [gas]			A	A	A	A	A	A	A	A	A	A	A		A	A	A	A	Flammable
Hydrogen Cyanide	<93		X	C	C	A	A	X	X	A	A	X	A			A	A	A	Toxic
Hydrogen Peroxide	<93		C	C	C	A	A	X	X	A	A	X	X		X	A	X	A	
Hydrogen Sulfide [wet]	<52		C	C	C	A	A	A	X	A	A	X	A		X	A	X	A	
Hydrogen Sulfide	<21	100	C	A	A	A	A	X	X	X	A	X	A		X	A	X	A	Flammable, Toxic
Hydrogen Sulfide	<52	100	C	A	C	A	A	X	X	X	A	X	A		X	A	X	A	Flammable, Toxic
Hypochlorous Acid	<21		X	X	A	X	A		X	X	A	X	X		X	A	A	A	
Iodine [wet]	<38		C	C	C	X	A	X	X	A	A	X	X		X	A	A	A	
Iodoform	<52		A	A	C	A	A	A	X	A	A	X	X		X	A	X	A	
Isobutane	<93		A	A	A	A	A	A	A	A	A	B	X		X	A	A	A	Flammable
Isobutyl Acetate	<93		A	A	A	A	A	A	A	A	A	X	A		B	A	X	A	Flammable
Isobutyl Alcohol			C	C	C	A	A	X	X	A	A	X	A		A	A	A	A	Flammable
Isobutene			C	C	C	A	A	X	X	A	A	X	A			A	A	A	
Isobutyl Methyl Ketone	<93		C	C	C	X	A	X	X	A	A	X	A		B	A	X	A	
Isobutyraldehyde			A	A	A	A	A	A	A	A	A	X	X			A	X	A	
Isopentane			C	C	C	A	A	X	X	A	A	A	X		X	A	A	A	Flammable
Isopropanol	<93		A	A	A	A	A	A	A	A	A	X	A		X	A	A	A	Flammable
Isopropyl Acetate	<93		A	A	A	A	A	A	A	A	A	X	X		X	A	X	A	
Isopropyl Alcohol			A	A	A	A	A	A	A	A	A	X	A		X	A	A	A	Flammable
Isopropylamine			A	A	A	A	A	A	A	A	A	X	A		A	A	X	A	
Jet Fuel JP-3, 4, 5, 6, 8			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Jet Fuel JP-9, 10, 911			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Kaolin [clay] Slurry			A	A	A	A	A	A	A	A	A	A	A			A	A	A	
Kerosene			A	A	A	A	A	A	A	A	A	X	X	A	X	A	A	A	Flammable

Product	Conditions		Metal Components			Face Materials						Secondary Seals						Comments	
	°C	%	316 SS	20Cb-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SiC-RB	SiC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM		FFKM
Lacquers (MEK Solvent)			A	A	A	A	A	A	A	A	A	X	A		X	A	X	A	Flammable
Lard (Food Grade Mat'l)			A	A	A	C	A	X	A	A	A	C	X		X	C	C	C	Flammable
Lactic Acid	<66		C	A	A	A	A	A	X	A	A	X	X		X	A	A	A	
Lactic Acid, 30-60%	<52		C	A	A	A	A	A	X	A	A	X	X		X	A	A	A	
Latex Emulsion			A	A	A	A	A	A	A	A	A	A	A			A	A	A	
Lead Acetate	<93		C	C	C	A	A	X	X	A	A	X	A		X	A	X	A	Toxic
Lead Chloride	<93		X	C	C	A	A	X	X	A	A	X	A		B	A	X	A	Toxic
Laed Nitrate	<93		C	C	C	A	A	X	X	A	A	B	A		B	A	A	A	Toxic
Levulinic Acid	<93		C	C	A	A	A	X	X	A	A					A		A	
Lime Slurry	<93	<50	C	C	A	A	A	A	A	A	A	B	A			A	A	A	
Linseed Oil	<204		A	A	A	A	A	A	A	A	A	B	X		X	A	B	A	Flammable
Liquid Natural gas (LNG)			A	A	A	A	A	A	A	A	A	A	X		A	A	A	A	Flammable
Liquid Petroleum Gas (LPG)			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Lithium Chloride	<100		C	A	A	A	A	A	A	A	A	X	A		B	A	X	A	Toxic
Lithium hydroxide	<100		C	C	C	A	A	X	A	A	A	X	A		B	A	X	A	Toxic
Lubricating Oil			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Lye, Soda																			See Sodium Hydroxide
Magnesium Chloride	<93		X	X	A	A	A	A	A	A	A	B	A		B	A	A	A	
Magnesium Hydroxide			C	C	C	A	A	X	A	A	A	X	A		X	A	A	A	
Magnesium Nitrate	<66		C	C	C	A	A	X	X	A	A	A	A			A	A	A	
Magnesium Sulfate	<66	<40	A	A	X	A	A	A	A	A	A	A	A		A	A	A	A	
Maleic Acid	<66		C	C	C	C	A	X	X	X	A	X	X		X	A	A	A	
Maleic Anhydride	<177		A		A	C	A	A	A	X	A	X	X		X	A	X	A	
Malic Acid	<100	<50	A	C	C	A	A	A	X	X	A	B	X		X	A	A	A	
Manganese Chloride	<93	<50	C	A	A	A	A	X	X	A	A	X	A		B	A	X	A	
Manganese Sulfate	<93		A	A	A	A	A	A	X	A	A	X	A		B	A	X	A	
Mercaptans	<21	100	A	A		C	A	A	X	A	A	A	X		X	A	A	A	
Mercuric Chloride	<66	<30	X	X	C	A	A	X	X	X	A	A	A		A	A	A	A	Toxic
Mercury	<66		A	A	A	A	A	A	A	A	A	A	A		A	A	A	A	Toxic
Methane			A	A	A	C	A	A	A	X	A	A	X		X	A	A	A	Flammable
Methanol (Methyl Alcohol)	<93		A	A	A	A	A	A	A	A	A	B	A		B	A	X	A	Flammable, Toxic
Methyl Acetate	<93		A	A	A	A	A	A	A	A	A	X	X		X	A	X	A	Flammable
Methyl Acrylate (Monomer)	<93		A	A	A	A	A	A	A	A	A	X	X		X	A	X	A	Polymerizes
Methyl Bromide			A		C	A	A	A	X	A	A	X	X		X	A	A	A	Toxic
Methyl Chloride	<52		A	C	A	A	A	A	X	A	A	X	X		X	A	A	A	Flammable, Toxic
Methyl Ethyl Ketone (MEK)	<66		C	C	C	A	A	X	X	A	A	X	A		X	A	X	A	Flammable
Methyl Ethyl Ketone (MEK)	<66	100	A	A	A	A	A	A	X	A	A	X	A		X	A	X	A	Flammable
Methyl Isobutyl Ketone (MIBK)	<66		C	C	C	A	A	X	X	A	A	X	X		X	A	X	A	
Methyl Methacrylate	<52		A	A		A	A	A		A	A	X	X		X	A	X	A	

Product	Conditions		Metal Components			Face Materials						Secondary Seals						Comments	
	°C	%	316 SS	20Cb-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SIC-RB	SIC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM		FFKM
Methyl Tert-Butyl-Ether (MTBE)	<93		C	C	C	A	A	X	A	A	A	X	X	X	X	A	X	A	
Methylene Chloride (Dichloride)	<52		C	A	C	A	A	A	X	A	A	X	X	X	X	A	X	A	
Mineral Oil			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Mineral Spirits			A	A	A	A	A	A	A	A	A	A	X			A	A	A	Flammable
Molasses			A	A	A	C	A	X	A	A	A	C	C			C	C	C	Food Grade Mat'l
Monoethanolamine (MEA)	<93		A	A	A	C	A	A	A	A	A	X	X	X	X	A	X	C	
Muriatic Acid																			See Hydrochloric Acid
Naphtha (Petroleum Benzin)			A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	Flammable
Naphthalene	<204		A	A	A	A	A	A	X	A	A	X	X	A	X	A	B	A	Flammable
Naphthalene Chloride	<93		A	A	C	A	A	A	A	A	A	X	X		X	A	A	A	
Naphthenic Acid	<149		A	A	C	A	A	A	X	A	A	X	X	X	X	A	A	A	
Nickel Chloride	<100	<80	C	C	A	A	A	A	X	A	A	B	A		X	A	A	A	
Nickel Plating Solution			C	C	C	A	A	X	X	A	A	A	A			A	A	A	
Nickel Sulfate	<52	<40	C	C	C	A	A	A	X	A	A	A	A		A	A	A	A	
Nitric Acid	<77	<60	A	C	X	X	A	A	X	X	A	X	X		X	A	X	A	
Nitric Acid	<52	<80	A	A	X	X	A	A	X	X	A	X	X		X	A	X	A	
Nitric Acid	<21		A	A	X	X	A	A	X	X	A	X	X		X	A	X	A	
Nitric Acid	<21	<70	A	A	A	X	A	A	X	X	A	X	X		X	A	X	A	
Nitric Acid	<21	<20	A	A	A	C	A	A	X	X	A	X	X		X	A	A	A	Acid Grade Carbon
Nitrobenzene			A	A	C	A	A	A	A	A	A	X	A	A	X	A	X	A	Flammable, Toxic
Nitroethane			A	A	C	A	A	A	A	A	A	X	X	X	X	A	X	A	Flammable
Nitrogen			A	A	A	A	A	A	A	A	A	A	A		A	A	A	A	
Nitromethane			A	A	A	A	A	A	A	A	A	X	X		X	A	X	A	Flammable
Nitropropane			A	A	C	A	A	A	A	A	A	X	X		X	A	X	A	Flammable
Nitrous Acid	<93		C	C	X	A	A	X	X	X	A	X	A			A	X	C	
Oleic Acid	<66		C	A	A	A	A	A	X	A	A	X	X		X	A	X	A	
Oleum	<52		C	C	A	X	A	A	X	X	A	X	X		X	A	A	A	See Sulfuric Acid
Olive Oil (Food Grade Mat'l)			A	A	A	C	A	X	A	A	A	C	X		X	C	C	C	Flammable
Oxalic Acid	<52		X	A	C	A	A	A	X	A	A	X	A		X	A	A	A	
Oxygen			A	A	A	A	A	A	A	A	A	X	X			A	X	A	Oxidizing Agent
Ozone (wet)			A	A	A	A	A	A	A	A	A	X	A		X	A	A	A	
Palm Oil			A	A	A	A	A	A	A	A	A	A	X			A	A	A	Flammable
Palmitic Acid	<204		A	A	A	A	A	A	A	A	A	B	X		X	A	B	A	
Paper Stock			A	A	A	A	A	A	A	A	A	A	A			A	A	A	Ref. [18]
Paracymene	<21		A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	
Paraffin, Molten			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Paraformaldehyde	<177	<30	A	A	A	A	A	A	A	A	A	X	B		B	A	X	A	
Paraldehyde	<93		A	A	A	A	A	A	A	A	A	X	A		B	A	X	A	
Peanut Oil (Food Grade Mat'l)			A	A	A	C	A	X	A	A	A	C	X		X	C	C	C	Flammable

Product	Conditions		Metal Components			Face Materials						Secondary Seals							Comments
	°C	%	316SS	20Cb-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SIC-RB	SIC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM	FFKM	
Pectin Liquor			A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	
Penicillin			A	A	A	C	A	X	A	A	A	X	X		X	C	C	C	FDA Grade Mat'l
Pentane	<93		C	C	A	A	A	X	A	A	A	B	X		B	A	A	A	Flammable
Perchloroethylene	<93	100	C	C	A	A	A	A	A	A	A	X	X		X	A	A	A	tetrachloroethylene
Peroxide of Hydrogen	<93		C	C	C	C	A	X	X	A	A	X	X		X	A	A	A	Special Carbon
Persulfuric Acid	<121		C	C		A	A	X	X	A	A	X	X		X	A	X	A	Explosive
Petroleum Ether			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable, Explosive
Petroleum Oil			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Phenol			C	C	A	C	A	A	X	X	A	X	X	A	X	A	A	A	Toxic
Phenyl Acetic Acid	<93		C	A	A	A	A	A	A	A	A	X	A		B	A	X	A	
Phosgene	<149		C		A	A	A	A	A	A	A	X	X	X	X	A	X	A	Toxic
Phosphoric Acid	<66	<85	A	A	A	A	A	A	X	A	A	X	A		X	A	A	A	
Phosphoric Acid	<93		X	C	A	A	A	A	X	A	A	X	A		X	A	A	A	
Phosphorous Oxychloride	<93		X	X	C	A	A	X	X	X	A	X	X	X	X	A	X	A	
Phosphorous Trichloride	<66	100	A		A	A	A	A	X	X	A	X	A		X	A	A	A	
Phthalic Acid	<204		A	C	C	C	A	A	X	A	A	X	B		B	A	X	A	
Phthalic Anhydride	<204		A	A	A	C	A	A	A	A	A	X	B		B	A	X	A	
Phthalic Anhydride [Crude]	<204		A		A	A	A	A	A	A	A	X	B		B	A	X	A	
Plating Solution, Chrome			X	C	C	X	A	X	X	A	A	X	A		X	A	A	A	
Plating Solution, Nickel/Copper			C	C	C	A	A	X	X	A	A	A	A		A	A	A	A	
Picric Acid	<93		C	C	C	C	A	X	X	X	A	X	X		X	A	A	A	
Polybutadiene [Rubber]			A	A	A	A	A	A	A	A	A					A		A	with Monomer
Polyethylene			A	A	A	A	A	A	A	A	A					A		A	with Monomer
Polyethylene Glycol			A	A	A	A	A	A	A	A	A	X	A	A	X	A	X	A	
Polypropylene Glycol			A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	
Polystyrene			C	C		A	A	X	A	A	A	X	X		X	A	X	A	with Monomer
Potash	<93		C	A	A	A	A	A	X	A	A	B	X		X	A	A	A	
Potassium Bicarbonate	<100	<30	A	C	C	A	A	A	X	A	A	X	A		B	A	X	A	
Potassium Bicarbonate	<100	>30	C	C	C	A	A	X	X	A	A	X	A		B	A	X	A	
Potassium Carbonate	<93		C	A	A	C	A	A	X	A	A	X	A		B	A	X	A	
Potassium Chloride	<93		C	A	C	C	A	X	X	X	A	B	A		B	A	A	A	
Potassium Cyanide	<93		C	C	C	C	A	X	X	X	A	B	A		B	A	A	A	Toxic
Potassium hydroxide	<149		X	C	C	C	A	X	A	X	A	X	B		X	A	X	A	
Potassium hydroxide	<21	<40	C	C	A	A	A	X	A	X	A	X	A		X	A	X	A	
Potassium Nitrate	<93		C	C	C	A	A	X	X	A	A	B	A	A	B	A	A	A	
Potassium Permanganate	<93		C	C	C	C	A	X	X	A	A	X	A	X	B	A	X	A	Oxidizing Agent
Potassium Phosphate [acid]	<93		C	C	C	C	A	X	X	X	A	X	A	X	B	A	X	A	
Potassium Silicate	<93		C	C	C	A	A	X	X	A	A	B	A		B	A	A	A	
Potassium Sulfate	<93	<10	A	A	A	A	A	A	X	A	A	B	A		B	A	A	A	
Propane			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Propionaldehyde	<66		A	A	A	A	A	A	A	A	A	X	A		A	A	X	A	
Propionic Acid	<66		C	C	A	C	A	A	X	A	A	X	A		A	A	X	A	Acid Grade Carbon

Product	Conditions		Metal Components			Face Materials						Secondary Seals							Comments
	°C	%	316SS	20Cb-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SIC-RB	SIC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM	FFKM	
Propyl Acetate	<66		A	A	A	A	A	A	A	A	A	X	X		X	A	X	A	
Propyl Alcohol [Propanol]	<93		A	A	A	A	A	A	A	A	A	B	A	A	B	A	A	A	Flammable
Propylene			A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	Flammable
Propylene Glycol			A	A	A	A	A	A	A	A	A	X	A		A	A	X	A	
Propylene Oxide	<93		A	A		A	A	A	A	A	A	X	X		X	A	X	A	Flammable
PVC [polyvinyl Chloride]			A	A	A	A	A	A	A	A	A	X	X		X	A	X	A	Toxic, with Monomer
Pyridine	<100		A	A	A	C	A	A	A	A	A	X	X		X	A	X	A	
Rosin, Paper Mill	<204		A	A	A	A	A	A	A	A	A	X	X		X	A	B	A	
Rosin Size	<177		A	A	A	A	A	A	A	A	A	X	B		B	A	X	A	
Salicylic Acid	<93		C	A	C	C	A	A	A	A	A	X	A			A	A	A	Acid Grade Carbon
Sea Water	<93		C	C	A	A	A	A	A	A	A	B	A		X	A	A	A	
Sewage, Sewage Sludge			A	A	A	A	A	A	A	A	A	A	A		X	A	A	A	
Silicone Oils			A	A	A	A	A	A	A	A	A	A	A		A	A	A	A	
Silver Chloride	<21		X	C	C	A	A	X	X	A	A	X	A		A	A	X	A	
Silver Nitrate	<21	<60	A	A	A	A	A	A	X	A	A	X	A		A	A	A	A	Toxic
Soap Liquors			A	A	A	A	A	A	A	A	A	A	A		X	A	A	A	
Soda Ash	<93		A	A	A	C	A	A	A	X	A	B	A		B	A	A	A	
Soda, Caustic																			Sodium Hydroxide
Sodium Acetate	<93		C	A	A	A	A	A	A	X	A	X	A		X	A	X	A	
Sodium Bicarbonate	<100	<20	A	A	C	A	A	A	A	A	A	B	A		B	A	A	A	
Sodium Bisulfite	<93		X	C	C	C	A	X	X	A	A	B	A		B	A	A	A	
Sodium Borate [Borax]	<93		A	A	A	A	A	A	A	A	A	B	A	A	B	A	A	A	
Sodium Bromide	<93		C	C	C	A	A	X	X	A	A	X	A		B	A	X	A	
Sodium Carbonate	<93		A	A	A	A	A	A	A	A	A	B	A		B	A	A	A	
Sodium Chlorate	<60		C	A	A	A	A	X	A	A	A	X	A		A	A	X	A	
Sodium Chloride	<93		X	C	A	A	A	A	A	A	A	B	A		B	A	X	A	
Sodium Chromate	<60		A	A	A	X	A	A	A	A	A	X	A		A	A	X	A	
Sodium Cyanide	<93		X	A		A	A	A	X	A	A	B	A		B	A	A	A	Toxic
Sodium Ferricyanide	<93		C	C	C	A	A	X		A	A	X	A		B	A	X	A	Toxic
Sodium Hydrosulfide	<93		A	A	A	A	A	A	A	A	A	X	A		B	A	X	A	
Sodium Hydroxide, 51-70%	<121		X	X	A	C	A	A	A	X	A	X	B		X	A	X	A	
Sodium hydroxide, 21-50%	<121		X	C	A	C	A	A	A	X	A	X	B		X	A	X	A	
Sodium Hydroxide, 1-20%	<121		A	C	A	C	A	A	A	X	A	X	B		X	A	X	A	
Sodium Hydroxide	<21	<40	A	C	A	C	A	A	A	X	A	X	A		X	A	X	A	
Sodium Hypochloride	<52		X	X	A	X	A	A	X	X	A	X	X		X	A	A	A	
Sodium Metasilicate	<93		A	A	A	A	A	A	A	A	A	X	A		B	A	X	A	
Sodium Nitrate	<100		A	A	A	C	A	A	A	A	A	X	A		X	A	A	A	
Sodium Nitrite	<93		A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	
Sodium Perchlorate	<93		A	A	C	C	A	A	A	X	A	X	A		B	A	X	A	
Sodium Phosphate [Mono, Di]	<93		A	A	A	A	A	A	X	A	A	B	A		X	A	A	A	

Product	Conditions		Metal Components			Face Materials						Secondary Seals						Comments	
	°C	%	316 SS	20Cb-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SiC-RB	SiC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM		FFKM
Sodium Phosphate, Tri	<93		A	A	A	A	A	A	A	A	A	B	A		X	A	A	A	
Sodium Silicate	<93		A	C	C	A	A	A	A	A	A	B	A		B	A	A	A	
Sodium Sulfate	<93		A	A	C	C	A	X	X	X	A	B	A		B	A	A	A	
Sodium Sulfide	<93		A	A	C	C	A	X	X	A	A	B	A		B	A	A	A	
Sodium Sulfit	<93		A	A	C	A	A	A	X	X	A	B	A		B	A	A	A	
Sodium Thiosulfate	<93		A	C	C	A	A	A	X	X	A	X	A		B	A	A	A	
Soybean Oil [Food Grade Mat'l]			A	A	A	C	A	X	A	A	A	C	X		X	C	C	C	Flammable
Stannic Chloride			A	X	X	A	A	X	X	A	A	A	A		X	A	A	A	
Starch			A	A	A	A	A	A	A	A	A	A	A		A	A	A	A	
Stearic Acid	<65		A	C	A	A	A	A	A	X	A	X	X	A	X	A	A	A	
Stoddard Solution			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	
Styrene [Monomer]	<93		A	A	A	A	A	A	A	A	A	X	X		X	A	X	A	Toxic
Succinic Acid	<93		A	C	C	A	A	X	X	A	A	X	A		B	A	X	A	
Sugar Solution [Sucrose]	<93		A	A	A	C	A	X	A	A	A	C	C		X	C	C	C	Food Grade Mat'l
Sulfur Dioxide [wet]	<93		A	C	C	A	A	X	X	A	A	X	A		X	A	X	A	
Sulfur, Molten	<204		A	X	A	A	A	A	A	A	A	X	X		X	A	A	A	Flammable
Sulfuric Acid, 0-90%	<52		X	A	A	C	A	A	X	X	A	X	X		X	A	A	A	Acid Grade Carbon & Hastelloy® B
Sulfuric Acid, 90-100%	<52		X	A	A	C	A	A	X	X	A	X	X		X	A	A	A	
Sulfuric Acid, 60-70%	<149		X	C	X	X	A	X	X	X	A	X	X		X	A	A	A	
Sulfuric Acid, Oleum	<52		C	C	A	C	A	A	X	X	A	X	X		X	A	A	A	
Sulfurous Acid	<65		C	C	C	A	A	X	X	X	A	X	X		X	A	X	A	
Tall Oil	<177		C	C	A	A	A	A	A	A	A	X	X		X	A	X	A	Flammable
Tannic Acid	<93		A	A	C	A	A	A	A	A	A	B	A		B	A	A	A	
Tar, Bituminous			A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	Flammable
Tartaric Acid	<65		A	C	A	A	A	A	X	A	A	A	X		X	A	A	A	
Tetrachloroethane		100	X	C	A	A	A	A	A	A	A	X	X	X	X	A	A	A	
Tetrachloroethylene	<121	100	C	C	A	A	A	X	A	A	A	X	X		X	A	X	A	
Tetraethyl lead			C	C	C	A	A	X	X	A	A	X	X		X	A	A	A	Toxic
Tetrahydrofuran (THF)	<38		C		A	A	A	A	X	A	A	X	X		X	A	X	A	
Therminols			A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	
Titanium Dioxide Slurry			A	A	A	A	A	A	A	A	A	X	A		A	A	X	A	
Titanium Tetrachloride	<38		C	C	C	A	A	X	X	A	A	X	X		X	A	A	A	
Toluene			A	A	A	A	A	A	A	A	A	X	X		X	A	X	A	Flammable
Transformer Oil			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Transmission Fluid			A	A	A	A	A	A	A	A	A	A	X		X	A	A	A	Flammable
Trichloroacetic Acid	<93		X	C	C	A	A	X	X	A	A	X	X		X	A	X	A	
Trichlorobenzene	<149	100	A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	Flammable
Trichloroethane	<93	100	A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	
Trichloroethylene	<93	100	A	A	A	A	A	A	X	A	A	X	X		X	A	A	A	Toxic
Triethanolamine (TEA)	<93		A	A	A	C	A	A	A	A	A	X	A		B	A	X	A	

Product	Conditions		Metal Components			Face Materials						Secondary Seals						Comments	
	°C	%	316 SS	20Cb-3	C-276	Carbon	Ceramic	Chrome Oxide	Tungsten Carbide	SiC-RB	SiC-AS	Nitrile	EPDM	TFE Propylene	Chloroprene	PTFE	FKM		FFKM
Trimethylamine (TMA)	<93		A	A	A	A	A	A	A	A	A	X	A		B	A	X	A	
Tung Oil			A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	
Turpentine			A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	Flammable
Ucon oils			A	A	A	A	A	A	A	A	A	A	A		A	A	A	A	
Urea	<177		C	C	C	A	A	X	A	X	A	X	X		X	A	X	A	
Vegetable oil	<149		A	A	A	C	A	X	A	A	A	C	X		X	C	C	C	Food Grade Mat'l
Vinegar			A	A	A	C	A	X	X	A	A	X	C		X	C	C	C	Food Grade Mat'l
Vinyl Acetate	<149		A	A	A	A	A	A	A	A	A	X	B	A	X	A	X	A	Polymerizes
Vinyl Chloride	<52		A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	Polymerizes, Toxic
Water, Boiler Feed			C	A	A	A	A	A	A	A	A	X	A	A	X	A	A	A	
Water, Borated			C	C	A	C	A	A	A	X	A	C	C	C	C	X	X	C	Nuclear Grade Mat'l
Water, Clean			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Water, Cooling Tower			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Water, Condensate	<121		A	A	A	A	A	A	A	A	A	B	B	A	B	A	A	A	Avoid Copper
Water, Deionized, Distilled			A	C	A	C	A	A	A	A	A	A	A	A	A	A	A	A	Also Demineralized
Water, Fresh River or Lake			A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Water, Heavy			A	A	A	C	A	A	A	A	A	C	C	C	C	C	C	C	Nuclear Grade Mat'l
Water, Potable			A	A	A	C	A	X	A	A	A	C	C	C	C	C	C	C	Food Grade Mat'l
Water, Sea, Brackish	<93		C	C	A	A	A	A	A	A	A	B	A		X	A	A	A	
Water, Sour			A	A	C	A	A	A	X	A	A	A	A			A	A	A	
Whiskey			A	A	A	C	A	X	A	X	A	C	C		C	C	C	C	Food Grade Mat'l
White Liquor, Kraft Pulping	<149		C	C	A	A	A	X	A	X	A	B	B	A	B	A	A	A	
White Water, Calcium			A	A	A	A	A	A	A	A	A	X	A			A	X	A	
White Water, Chlorine Dioxide			X	C	C	A	A	X	X	A	A	X	X		X	A	A	A	
White Water, Caustic			A	A	A	A	A	A	X	X	A	X	A		A	A	X	A	
White Water, Paper Machine			A	A	A	A	A	A	A	X	A	A	A			A	A	A	
Wine			A	A	A	C	A	X	A	A	A	C	C	C	C	C	C	C	Food Grade Mat'l
Wort			A	A	A	C	A	X	A	A	A	C	C		C	C	C	C	Food Grade Mat'l
Xylene [Xylol]	<177		A	A	A	A	A	A	A	A	A	X	X		X	A	A	A	Flammable
Yeast, Torula	<66		A	A	A	C	A	X	A	A	A	C	C		C	C	C	C	Food Grade Mat'l
Yeast, Wort	<66		A	A	A	C	A	X	A	A	A	C	C		C	C	C	C	Food Grade Mat'l
Zinc Chloride			X	C	A	C	A	A	X	X	A	A	A	A	A	A	A	A	
Zinc Cyanide			C	C	A	A	A	A		A	A	X	A		A	A	X	A	Toxic
Zinc Nitrate			C	C		A	A	X		A	A	A	A			A	A	A	
Zinc Phosphate	<66	<20	A			A	A	A		A	A	A	A		A	A	A	A	
Zinc Sulfate	<93		A	A	A	A	A	X	X	A	A	B	A	A	B	A	A	A	



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