MECHANICAL SEALS
&
ENGINEERED SEALING SYSTEMS

WHERE LEAKAGE IS NOT AN OPTION

Daybreak Technologies
Liquid Engineeing Solutions

Welcome

Welcome to the world of Daybreak Liquid Engineering Solutions Division (Seal Group). This product Brochure is designed to make you familiar with the latest Seal Group products and services.

Daybreak has focused on seal selection based on application and industry. Application engineering based sealing technology helps you to decide on the right type of seal .We have limited the number of seal choices, which will help you to optimize your seal selection.

You will have an immediate impression of the mechanical Seal's main application target and operating window by just looking at the content of sections provided in this brochure. Furthermore, we have incorporated a basic explanation on seal operation and additional technical background information.

Daybreak LES

Daybreak Liquid Engineering solutions mission is to be the world's premier provider of sealing solutions, providing you with a well balanced range of high quality products and services to satisfy all your sealing requirements. Daybreak LES represents not only a collection of trusted products, but also a single source that can help you to reduce your total cost of ownership.

Synergy

Daybreak Technologies can help you reduce the cost of plant ownership through enhanced sealing reliability and reduced maintenance, comprehensive technical services and lower transaction costs. As a pioneer in developing application based tailor made solutions, Daybreak can offer various different commercial agreements where ARC on maintenance and supply of various seals and spares existing in your plant can be designed as per your need.

Technology

Greater depth of experience and the blending of technological perspective positions Daybreak Technologies to introduce superior technologies and quickly apply these technologies as practical sealing products.

Quality

We mean what we say when we talk about quality. Designing and manufacturing seals and auxiliaries that exceeds our customer's expectations is an important part of our dedication to Total quality. Our commitment to consistent quality is documented by the fact that Daybreak's LES facilities are on the way to get prestigious ISO 9001 certification.

Service

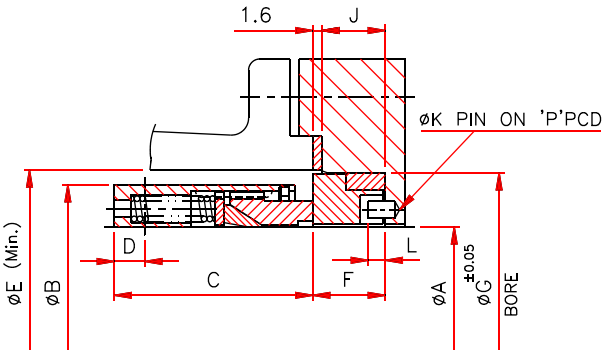
Round the clock and all over India, Daybreak's staff is available to resolve customer's problems. Our Engineers have great experience and technical knowledge of mechanical seals, support system and rotating equipments, which enables them to quickly point out the root cause accurately.

Tel.: 91-22-28228833, Fax : 91-22-28241558
E-mail : info@daybreakworld.com
Website : www.daybreakworld.com

Series DB-M

Multispring Seals

Type DB-MUT/DB-MUV (Unbalanced)
Type DB-MBT/DB-MBV (Balanced)



DB-MUT

øA		øB	C	D	øE	F	øG	J	øK	L	'P'
Inch	mm.										
1.0	25.40	36.7	25.4		38.7		41.30				30.0
1.125	28.58	40.0			43.0		44.45				33.0
1.25	31.75	43.0	27.0		45.9	11.1	47.62	9.5	2.5		36.5
1.375	34.92	49.5	28.6	5.5	52.5		50.80				39.5

Applications:

General chemical applications, oil refining and petrochemical, Pharmaceutical industries.

Suitable for use with abrasive clear and corrosive fluids and for cryogenic and high temperature applications.

By choosing suitable component material the seals can be adapted to operate with a wide range of liquid and operating conditions.

Operating Limits

Size range: 3/8" to 8" (10mm to 200 mm)

Temperature -50c° to + 500 c°/-60 F° to 930 F° depending on the material used.

Pressure: Type DB-MU-Up to 17 bar g/247 psig, Type DB-MB Up to 62 bar g/900 psig.

Speed: Up to 6000 RPM according to seal size and working pressure.

Versatile Constructions/Options

Type DB-MUT (Unbalanced) / DB-MBT (Balanced)

Wedge sealing member available in PTFE and exfoliated Graphite material. Creates positive seal for use in extreme temperature/chemical.

Type DB-MUV (Unbalanced) / DB-MBV

An "O" ring sealing member available in various rubbers. TTV "O" rings and other choices available as per the applications.

Design features:

Precision Lapped Sealing Faces

Lapping process results in high precision finish with optimal flatness.

Balanced/Unbalanced designs

Positive hydraulic balancing permits use in high pressure. Unbalanced design can be used for lower pressure applications, saves cost.

Even Face pressure

The multi-spring designs ensure even face pressure for minimal face wear and compensation for some shaft misalignment.

Compact design

Permits use in all types of rotating equipments such as centrifugal pumps, mixers, and agitators.

Field repairable

Reduces inventory requirements. Seals can be repaired easily on site or at any Daybreak's seal repair centers, and/or converted to various seal face combinations.

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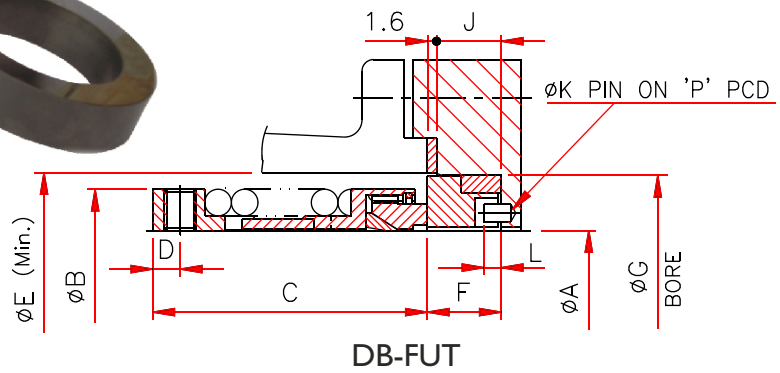
Series DB-F

Single Coil Spring Seals



DB-FUT

Type DB-FUT/DB-FUV (Unbalanced)
Type DB-FBT/DB-FBV (Balanced)

ØA		ØB	C		D	ØE	F	ØG	J	ØK	L	'P'
Inch	mm.											
1.0	25.40	38.0	44.5	44.5	4.5	41.0	11.1	41.30	9.5	2.5		30.0
1.125	28.58	41.0				44.0		44.45				33.0
1.25	31.75	46.0	48.0	48.0		49.0		47.62				36.5
1.375	34.92	49.2				52.2		50.80				39.5

Applications:

General chemical applications, oil refining and petrochemical, Pharmaceutical industries.

Suitable for use with abrasive contaminated and corrosive fluids, for slurries, sludges and effluents with solid presence.

By choosing suitable component material the seals can be adapted to operate with a wide range of liquid and operating conditions.

Operating Limits

Size range: 3/8" to 8" (10mm to 200 mm)

Temperature: -50 c° to + 500 c°/-60 F° to 930 F° depending on the material used.

Pressure: Type DB-FU-Up to 17 bar g/247 psig, Type DB-FB Up to 62 bar g/900 psig.

Speed: Up to 6000 RPM according to seal size and working pressure.

Versatile Constructions/options

Type DB-FUT (Unbalanced) / DB-FBT (Balanced)

Wedge or "U" pack sealing member available in PTFE and exfoliated Graphite material. Creates positive seal for use in extreme temperature/chemical.

Type DB-FUV (Unbalanced) / DB-FBV

An "O" ring sealing member available in various rubbers. TTV "O" rings and other choices available as per the applications.

Design features:

Precision Lapped Sealing Faces

Lapping process results in high precision finish with optimal flatness.

Balanced/Unbalanced designs

Positive hydraulic balancing permits use in high pressure. Unbalanced design can be used for lower pressure applications, saves cost.

Single Coil Spring

The single coil spring designs ensure the safe pass thru of contamination or solids presence in the process liquid. On clog design which allows the usage of seal in wide range of slurries and sludge type applications.

Compact design

Permits use in all types of rotating equipments such as centrifugal pumps, mixers, and agitators.

Field repairable

Reduces inventory requirements. Seals can be repaired easily on site or at any Daybreak's seal repair centers, and/or converted to various seal face combinations.

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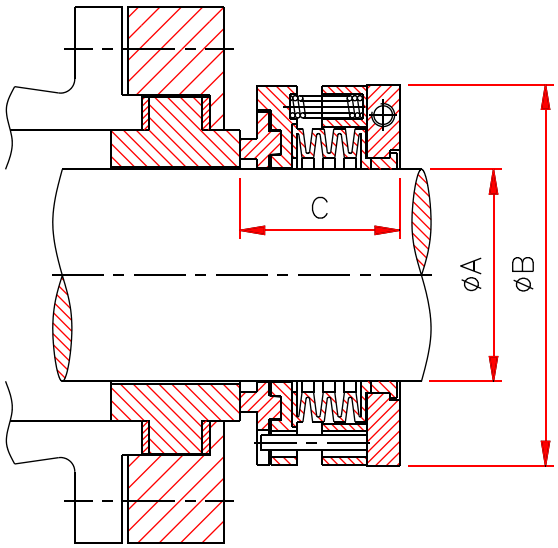
Series DB-TB

Teflon Bellow Seals

Type DB-TB



DB-TB

ØA		ØB	C	ØA	ØB	C
Inch	mm.			mm.		
1.0	25.40	57.4	29.8	18.0		29.8
1.125	28.58	60.6		19.0		
1.25	31.75	64.75		20.0		
1.375	34.92	67.85		22.0		

Applications:

For use with extremely corrosive chemicals, including concentrated Acids and salts, strong oxidizing agents and chemically active compounds.

Suitable for use with abrasive contaminated and corrosive fluids and for Slurries, sewage water, viscous liquids.

By choosing suitable component material the seals can be adapted to operate with a wide range of liquid and operating conditions.

Operating Limits

Size range: 1" to 6" (10mm to 200 mm)

Temperature: -50 c° to + 120 c°/-50 F° to 250 F° depending on the material used.

Pressure: 13 bar g/185 psig.

Speed: Up to 3000 RPM according to seal size and working pressure.

Versatile Constructions/options

Type DB-TB

All surfaces contacting the liquid being sealed are made of chemically inert materials. Metallic components are located outside the seal chambers and isolated from the liquid area.

Design features:

External Mounting

Mounted outside of the seal chambers with only the internal surfaces of the bellows and face in contact with the liquid.

Flexible PTFE Bellows

Maximum corrosion resistance. Eliminates the possibilities of seal face misalignment. Compensates for shaft run-out to promote long life operation.

Mechanical Drive

Half clamps secure the bellows tail to the shaft and eliminates galling and premature shaft wear.

Replaceable Seal Face

These seals have replaceable seal face insert, so that different face materials can be used to handle wide range of corrosive and abrasive fluids.

Field repairable

Reduces inventory requirements. Seals can be repaired easily on site or at any Daybreak's seal repair centers, and/or converted to various seal face combinations.

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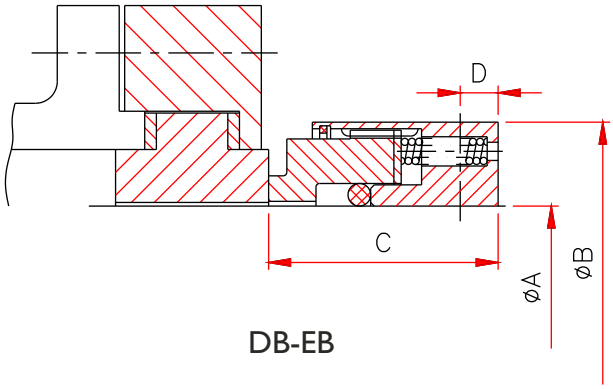
Series DB-EB

Reverse Balanced Multi Spring Seals

Type DB-EB (Reverse Balanced Seals)



DB-EB

ØA		ØB	C	D	ØA	ØB	C	D
Inch	mm.				mm.			
4.125	104.78	133.2	42.0	8.5	70.0		42.0	6.5
4.25	107.95	136.8			75.0	104.0		
4.375	111.13	140.0			80.0	108.0		
4.5	114.30	143.2			85.0			8.5

Applications:

General chemical applications, oil refining and petrochemical, Pharmaceutical industries.

Suitable for use with abrasive clear and corrosive fluids and for cryogenic and high temperature applications. Most recommended for Vacuum applications.

By choosing suitable component material the seals can be adapted to operate with a wide range of liquid and operating conditions.

Operating Limits

Size range: 3/8" to 8" (10mm to 200 mm)

Temperature : -50 c° to + 500 c°/-60 F° to 930 F° depending on the material used.

Pressure: Up to 52 bar g/750 psig.

Speed: Up to 6000 RPM according to seal size and working pressure.

Versatile Constructions/options

Wedge sealing member available in PTFE and exfoliated Graphite material. Creates positive seal for use in extreme temperature/chemical.

Type DB-EBV

An "O" ring sealing member available in various rubbers. TTV "O" rings and other choices available as per the applications.

Design features:

Precision Lapped Sealing Faces

Lapping process results in high precision finish with optimal flatness.

Reverse Balanced designs

Reverse hydraulic balancing permits use in high vacuum & positive pressure.

Even Face pressure

The multi-spring designs ensure even face pressure for minimal face wear and compensation for some shaft misalignment.

Compact design

Permits use in all types of rotating equipments such as centrifugal pumps, mixers, and agitators.

Field repairable

Reduces inventory requirements. Seals can be repaired easily on site or at any Daybreak's seal repair centers, and/or converted to various seal face combinations.

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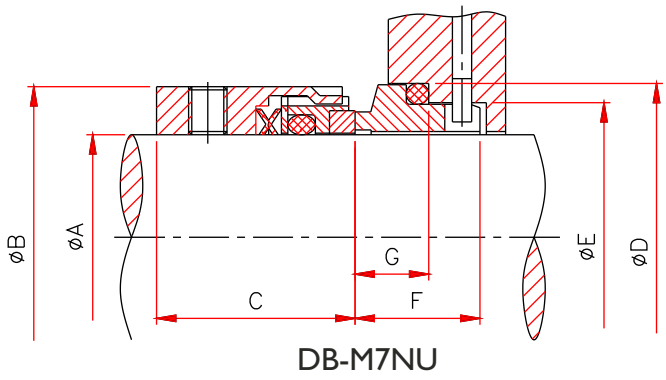
Wave Spring Seals



DB-M7NU

Type DB-M7NU (Unbalanced Seals)
Type DB-M7NB (Balanced Seals)

SEAL SIZE øA	øB	C	øD	øE	F	G
25.0	40.0	28.5	40.0	34.0	19.5	11.5
28.0	43.0	31.0	43.0	37.0	19.5	11.5
29.0	44.0	31.0	45.0	39.0	19.5	11.5
30.0	45.0	31.0	45.0	39.0	19.5	11.5
32.0	47.0	31.0	48.0	42.0	19.5	11.5
33.0	48.0	31.0	48.0	42.0	19.5	11.5

Applications:

General chemical applications, oil refining and petrochemical, Pharmaceutical industries.

Suitable for use with abrasive clear and corrosive fluids and for cryogenic and high temperature applications.

By choosing suitable component material the seals can be adapted to operate with a wide range of liquid and operating conditions.

Operating Limits

Size range: 3/8" to 8" (10mm to 200 mm)

Temperature: -50 c° to + 500 c°/-60 F° to 930 F° depending on the material used.

Pressure: Type DB-M7NU-Up to 17 bar g/247 psig, Type DB-M7NB Up to 62 bar g/900 psig.

Speed: Up to 6000 RPM according to seal size and working pressure.

Versatile Constructions/options

Type DB-M7NU (Unbalanced) / DB-M7NB

An "O" ring sealing member available in various rubbers.TTV "O" rings and other choices available as per the applications.

Design features:

Precision Lapped Sealing Faces

Lapping process results in high precision finish with optimal flatness.

Balanced/Unbalanced designs

Positive hydraulic balancing permits use in high pressure. Unbalanced design can be used for lower pressure applications, saves cost.

Wave Spring Design

Non-Clog wave type design of the single spring offers advantage in handling contaminated liquids. Occupies less space and offers even face pressure.

Compact design

Permits use in all types of rotating equipments such as centrifugal pumps, mixers, and agitators.

Field repairable

Reduces inventory requirements. Seals can be repaired easily on site or at any Daybreak's seal repair centers, and/or converted to various seal face combinations.

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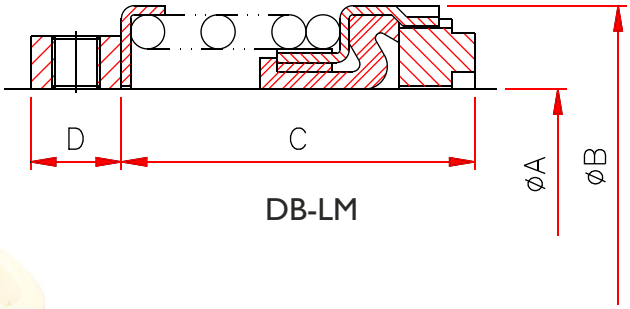
Low Profile Seals

DB-LP DB-LM



DB-LM

Type DB-LP Low Profile Seals
Type DB-LM Rubber Bellow Seals

øA		øB	C		D	øA	øB	C		D
Inch	mm.		SHORT SPRING	LONG SPRING		mm.		SHORT SPRING	LONG SPRING	
0.5	12.70		22.2		8.0	12.0	21.7	22.2		8.0
0.625	15.88					14.0	24.0			
0.75	19.05	31.5				15.0	25.0			
0.875	22.22	32.7				16.0	26.2			
1.0	25.40	38.0	25.4			18.0	29.5			
1.125	28.58	41.3	27.0			19.0	31.5			
1.25	31.75	44.8				20.0	32.5			
1.375	34.92	48.0	28.6			22.0	32.7			

Applications:

For pulp and paper, petrochemicals, food processing, wastewater treatment and other demanding applications.

Suitable for use with abrasive contaminated and corrosive fluids, for slurries, sludge and effluents with solid presence.

By choosing suitable component material the seals can be adapted to operate with a wide range of liquid and operating conditions.

Operating Limits

Size range: 3/8" to 6" (10mm to 200 mm)

Temperature: -40 c° to + 205 c°/-40 F° to 400 F° depending on the material used.

Pressure: Type DB-LP-Up to 17 bar g/247 psig, Type DB-LM Up to 62 bar g/900 psig.

Speed: Up to 6000 RPM according to seal size and working pressure.

Versatile Constructions/options

Type DB-LP

An"O" ring or "U" pack-sealing member available in TTV, Rubber and Flexible Grphite, creats positive sealing along with the rotating shaft.

Type DB-LM

Typical Duck Bellow made of suitable rubber. The tail end of the duck bellow is held tight to the shaft to form a static sealing joint. As the seal face wear occurs, the bellow convolution extends the seal face to compensate the wear.

Design features:

Self-Aligning Design

Automatic adjustment compensates for abnormal shaft end play, run0out, and primary sealing wear and machinery tolerances leading to improved seal life.

Compact Design

Full convolution elastometric Bellows designed for confined spaces and limited gland depths. Self-aligning feature compensates for shaft end play and run-out.

Single Coil Spring

The single coil spring designs ensure the safe pass thru of contamination or solids presence in the process liquid. On clog design which allows the usage of seal in wide range of slurries and sludge type applications.

Field repairable

Reduces inventory requirements. Seals can be repaired easily on site or at any Daybreak's seal repair centers, and/or converted to various seal face combinations.

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E-mail : info@daybreakworld.com
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Series DB-MB

Metal Bellow Seals

Type DB-MB Metal Bellow Seals

Applications:

For use with high temperature oils, chemicals, Petrochemicals and refinery processing DIN 24960 and ANSI B73 pump applications

Suitable for process services requiring corrosion resistance.

By choosing suitable component material the seals can be adapted to operate with a wide range of liquid and operating conditions.

Operating Limits

Size range: 1" to 6" (10mm to 200 mm)

Temperature: -75 c° to + 430 c°/-100 F° to 800 F° depending on the material used.

Pressure: 35 bar g/500 psig.

Speed: Up to 3000 RPM according to seal size and working pressure.

Versatile Constructions/options

Type DB-MB

Edge welded Metal bellow seals are constructed by series of stainless steel diaphragm together to from a bellow unit. The bellow unit eliminates the need of springs and provides flexibility to the seal in addition compensates for seal face wear.

Design features:

Optimum Designed Bellows.

Provides superior performance in the most difficult process services.

Daybreak Graphoil Secondary Seal

Pure and flexible Graphite packing allows seal to be used in extreme temperature conditions.

Tilted Bellows Angle

Angle of bellow section is tilted at the inner diameter weld to relive stress concentration and provide longer seal life. Double nested configuration improves flexibility and reduces stresses.

Large Grub Screws and Cap screws

Ease of installation with strength. Provides firm grip on the rotating element.

Self-Cleaning Design

Rotating bellows throw off suspended solids that clog the spring type seals. This self-cleaning action eliminates the need of external flushing, filters or cyclone separator and their associated cost.

Field repairable

Reduces inventory requirements. Seals can be repaired easily on site or at any Daybreak's seal repair centers, and/or converted to various seal face combinations.

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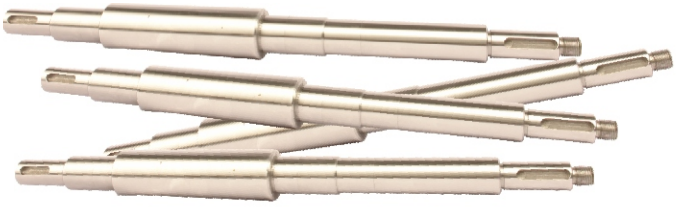
High Performance Seal Hardware



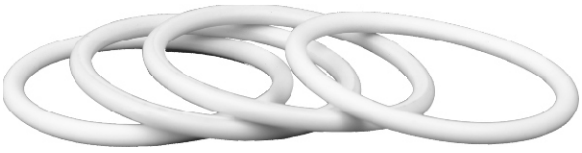
Precision Machined Shafts

Precision Machined Gland Box & Sleeves

Teflon Coated Hastelloy Springs

Hexlloy Grade Silicon Carbide
99.97 grade Pure Ceramic

Ceramic Sleeves



TTV 'O' Rings

Pure & Flexible Graphite Packings

Daybreak High Performance Seal Hardware

Daybreak in it's quest to provide perfect solutions for sealing technology has set up a separate division for High Performance Seal hardware. Often it is observed that seal failure is due to bad sleeve, inaccurate machined shaft or wrong selection of seal hardware like springs.

In order to provide the correct hardware Daybreak designs, manufactures and supplies variety of hardwear required for various equipments.

- Precision machined shaft for pumps in SS-316,SS-316-L,Alloy-20,and Hastelloy.
- Precision machined shaft sleeves.
- Ceramic sleeves.
- Solid Silicone Carbide sleeve.
- Load tested springs in Hastelloy, Alloy-20, SS-316.
- Teflon coated springs and other hardware like half clamps, Cap screws etc.
- Pure & Flexible Graphite for Temperature range upto 800 C^{o}.
- Mild Steel Nut Bolts molded with protective cover of PP, PVDF and Teflon.

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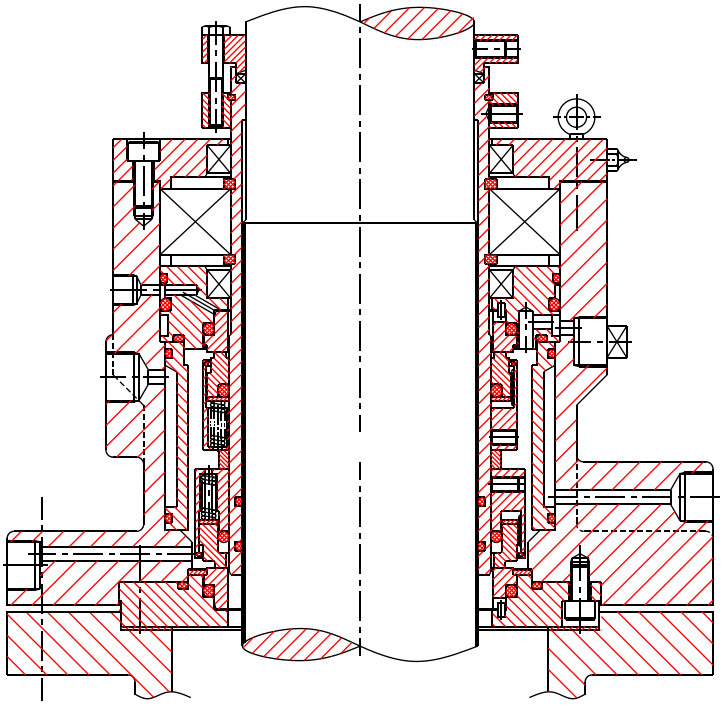
Mixer, Agitator and Vessel Seals



Daybreak High Performance Mixer, Agitator & Vessel Seals

Daybreak Seal designs and installations for mixers, agitators and vessels vary according to their position on the vessel, that is, whether the rotating shaft is top, side or bottom entry. Also, the material of the vessel, whether it is steel or glass-lined, has a significant influence on the seal design.

Daybreak has a complete range of products for all vessel configurations and relevant design standards. Special designs are also made for specific customer requirements.

Top Entry Vessels

Seals for top entry vessels are expected to retain the gas or vapour above the fluid in the vessel. To do this, double seals are normally recommended, although for very light duties a single seal can be used. Unlubricated or dry running seals are being increasingly applied because they avoid the need for a seal lubricating system.

Side Entry Vessels

In a side entry vessel the seal is normally fully immersed in the liquid in the vessel. Therefore, the seal arrangements tend to be similar to conventional pump seal installations.

Bottom Entry Vessels

The seal in a bottom entry vessel is also fully immersed in the liquid, but unlike the side entry arrangement, careful consideration has to be given to the possible accumulation of solids and other debris around the seal.

Short Axial Length Seals

Vessels are often designed with the shortest possible shaft length to reduce deflection and production costs. Normally, this requires the bearing to be positioned as close as possible to the vessel body, which has led to the development of short axial length seal designs, and installations which incorporate the bearing and seal into one integrated unit.

GMP Seals

GMP Standard Seals are new development corresponding to the requirement of pharmaceutical industries. These seals are strictly made from high grade of stainless steel. All components are precision machined with shining buff polished to avoid any contamination.

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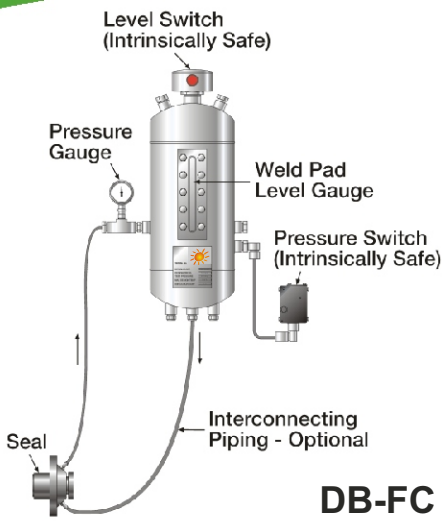
Website : www.daybreakworld.com

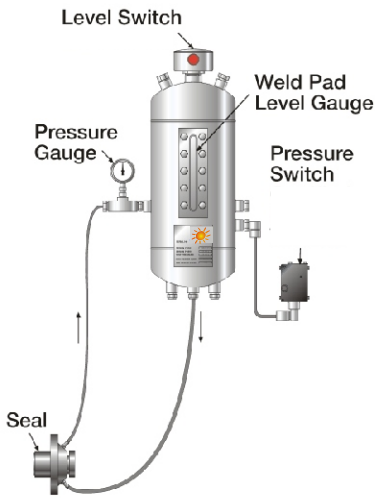
Sealant Systems

Fluid Control Equipment

DB-TS-1



DB-FC



DB-TS-2

DB-TS-3

Growing environmental awareness, and legislation to avoid fugitive emissions, as well as safety considerations are increasing the need for pressurised double seal installation.

All pressurised double seals require a controlled sealant supply to provide the necessary cooling and lubrication for long seal life.

Equally, the performance and integrity of any pressurised double seal is directly related to the selection and installation of the best sealant system for the application.

When deciding on the type of sealant system, it is necessary to take into account not only the duty parameters, but also many other features of the installation.

Sealant systems can generally be classified into two distinct groups:

- Vessel or thermosyphon type systems
- Pumped or forced circulation type system

Daybreak Technologies

Unit No.5, New Metalage Indl. Premises, Subhash Road, Jogeshwari (E), Mumbai - 400 060. INDIA
Tel.: 91-22-28228833, Fax : 91-22-28241558 E-mail : info@daybreakworld.com, uday@daybreakworld.com
Website : www.daybreakworld.com