AESSEAL®
ENVIRONMENTAL TECHNOLOGY

MagTecta™

Magnetic Double Face Bearing Protector Range

- Eliminate over 50% of bearing failures
- Improve your plant uptime
- Reduce premature bearing failures
- Reduce your maintenance costs

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One of Industry's Oldest Problems .....

Existing Problems

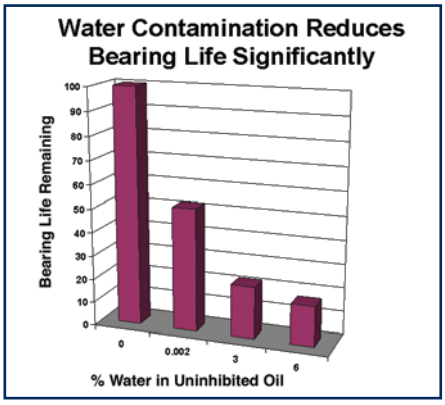
The Problem with Lip-Seals – What is the True Cost?

Extensive testing shows conclusively that lip-seals cannot effectively protect your bearing oil.

Other recognized problems with lip-seals include:

- Lip-seals have a short effective lifespan
- Lip-seals are ineffective at keeping contamination from bearing housings
- Lip-seals can seriously wear shafts, causing extensive equipment damage and added cost
- When lip-seals leak, loss of lubrication causes catastrophic bearing and equipment failure

For these reasons API 610 11th edition, section 6.10.2.6 states **"Lip-type seals shall not be used"**



Research conducted at a major academic institution has shown that water contamination as low as 0.002% (20 ppm) in some oils can reduce bearing life by as much as 48%.

Limitations of OEM Style Labyrinth Bushes / Rings

Labyrinth bushes / rings supplied by OEMs to meet API specifications for non-contacting sealing provide minor improvements for oil retention but only offer marginal protection against contamination ingress and no protection against bearing chamber breathing.

Shaft damage from a lip-seal

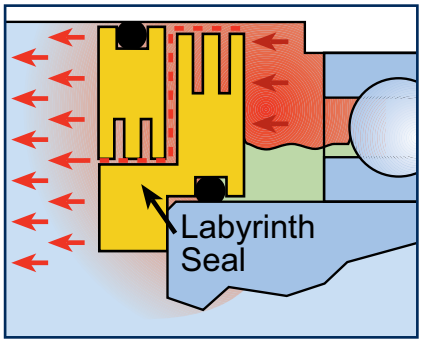
Shaft damage from a labyrinth seal

Bearing Chamber Breathing — Moisture Contamination

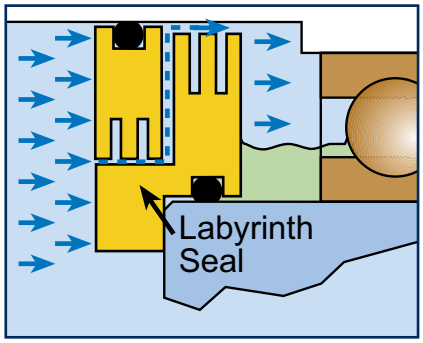
During operation the lubrication fluid and air expand as the bearing chamber warms. In a typical labyrinth arrangement this expansion will expel air through the labyrinth and out of the bearing chamber.

Once the equipment stops, the bearing chamber cools. The air inside then contracts, sucking moist air past the labyrinth arrangement and back into the bearing chamber. Even the smallest amount of moisture will reduce bearing life dramatically.

With the MagTecta™ product range it is possible to seal the bearing chamber preventing breathing and thus extending equipment life.



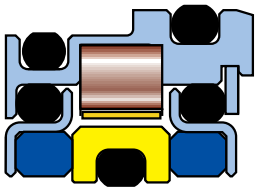
As the shaft turns, heat is generated and warm air is expelled.



As the shaft stops and the equipment cools down, cold air and moisture are sucked in and the bearing fails.

Moisture contaminated bearings

is resolved by the Ultimate Solution!

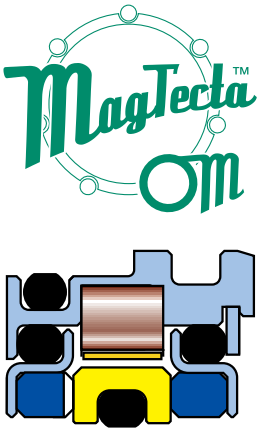


MagTecta™ — Magnetic Face Seal Design

The Original Double Face Bearing Protector

After many years of research and development, AESSEAL® is proud to offer products which, in its opinion, are probably the most technologically advanced bearing protectors in the world. The designs combine the latest AESSEAL® "pure innovation" with its world-leading, customer orientated, "modular" concept. From the company which brought to market probably the first modular cartridge mechanical seal range, there is now another world first – a modular dual face seal bearing protector range.

Reversible design. TXS (Thin Cross-Section) or LXS (Large Cross Section) designs available.



MagTecta-OM™ — Oil Mist Applications

The Modern API Compliant and Environmentally Friendly Option

In most modern day refineries, oil mist is the preferred method of bearing lubrication. Many refineries however, rely upon labyrinth technology which requires the oil mist to leak out and contaminate the surrounding area. In many parts of the world, this practice is not viewed as environmentally acceptable.

Because labyrinth seals leak, refineries usually over-compensate the supply of oil mist, by a factor of four to maintain pressure. This means wasted energy and loss of oil mist, both of which are expensive.

The MagTecta-OM™ is designed specifically for oil mist recirculation applications: Minimizing leakage into the environment so there is no need for over compensation of oil mist supply. Costs are therefore reduced. The MagTecta-OM™ is also suitable for use on oil splash lubrication, especially at higher shaft speeds.

The MagTecta-OM™ cannot be used if the oil mist system is designed to leak through a labyrinth seal and pollute the environment.

API Compliant

API 610 (ISO 13709) is considered by many to be the premium equipment specification for centrifugal pumps in the petroleum, petrochemical and natural gas industries. Since the 10th edition the standard recognizes the need for proper bearing protection: 5.10.2.7 "Bearing housings shall be designed to prevent contamination by moisture, dust and other foreign matter. Bearings shall be equipped with replaceable type labyrinth or **magnetic** type seals. **Lip-seals shall not be used."**

Non-reversible design.

Bearing Protector Design Features

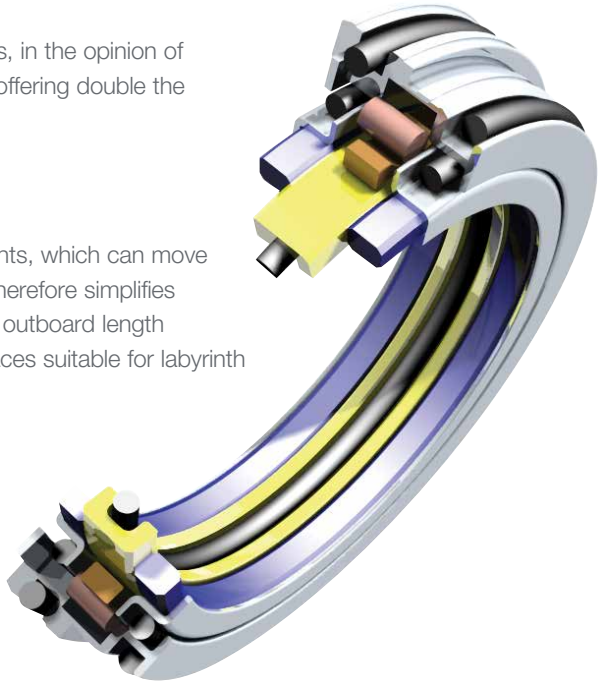
AESSEAL® bearing chamber expansion unit stock code: EEC25-03.

Sealed Bearing Chambers

Using the MagTecta™ range it is possible to seal the bearing chamber. AESSEAL® also offers a sealed Expansion Unit, with integral diaphragm. In some applications this is used to seal the breather port orifice in the bearing chamber, which is sometimes the other source of moisture ingress.

Double Faces – Double the Protection

The MagTecta™ range includes two sets of seal faces. These products, in the opinion of AESSEAL®, are the world's first modular dual face bearing protectors, offering double the protection of a conventional single seal face design.



Compact Design

The MagTecta™ range has no setting clips or axially floating components, which can move or be damaged during installation. The robust, compact construction therefore simplifies installation and is operator friendly. Furthermore, the short inboard and outboard length means that the MagTecta™ range can be installed in just about all spaces suitable for labyrinth devices or lip / oil seals.

Sacrificial Shroud

The MagTecta™ range incorporates a phosphor bronze shroud, around which the magnets are spaced equally, to ensure uniform seal face loading. Furthermore, the shroud acts as a sacrificial component preventing the possibility of equipment seizure and / or metallic component spark generation, which is possible with excessive radial shaft movement.

Multiple Seal Face Material Selection

The MagTecta™ seal faces are not limited to materials which need to be magnetic.
The MagTecta™ and MagTecta-OM™ seal face materials are Antimony Carbon versus solid Tungsten Carbide (up to 5.937" / 149mm) and a special Dry running Carbon versus solid Tungsten Carbide for larger shaft sizes.

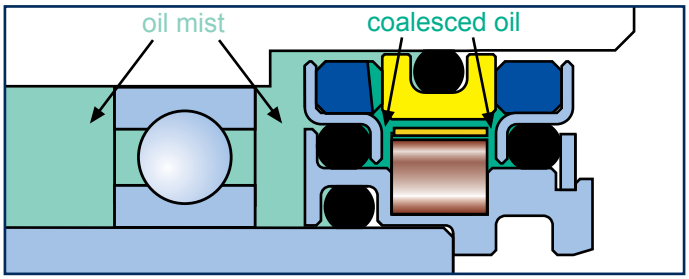
Axial Position of the Rotary Elastomer

Certain pieces of equipment have stepped shafts adjacent to the axial face of the bearing chamber. The axial position of the rotary elastomer helps to ensure that the MagTecta™ range will fit both plain and stepped shafts without resorting to unique designs. Special MagTecta™ designs, to suit very small radial cross sectional spaces or unusual stepped shaft configurations, can be supplied if there is sufficient demand for them.

MagTecta™ OM

Innovative Design

Suitable for Oil Mist Recirculation Applications



The unique 'laser engraved' inboard face of the MagTecta-OM™ (shown left) allows oil mist to enter through its face grooves. Once inside the oil mist liquefies to provide an oil splash environment at the external seal faces. This provides seal face lubrication, making the MagTecta-OM™ ideally suited for this environment.

Operating Performance Information

The following graphs show worst case temperature scenarios, plotted against peripheral shaft speeds, for applications with an ambient temperature of 18ºC (65ºF).

Data was gathered over many shaft sizes using continuous computerized data logging. Temperatures were recorded in a **still air** environment at several positions of the MagTecta™ and also in the oil. The temperature at the hottest part of the seal in contact with the atmosphere (the outboard seal face) is shown.

The MagTecta™ and MagTecta-OM™ are specifically designed to operate in marginal lubrication applications, as found in most bearing chamber designs.
The temperatures shown in the oil-splash graph were obtained using a small volume of mineral oil (500cc / 0.132 galls), in a splash environment operating in a 316L S/S (semi-insulated) housing. Clearly, operating temperatures will be significantly lower in **dynamic air**, with synthetic oil and / or a typical bearing chamber.

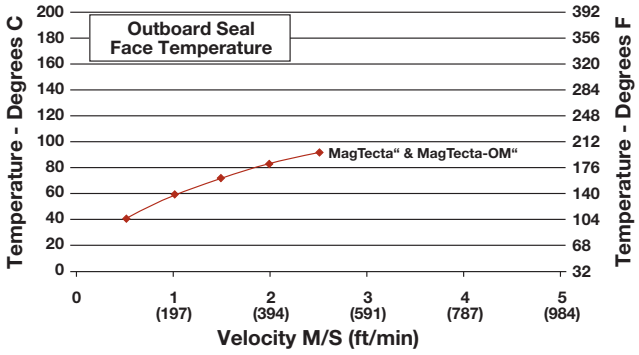
Dry running or grease applications offer different lubrication regimes and therefore different operational performance characteristics will result.

The MagTecta-OM™ is designed to operate in oil mist recirculation applications. Temperatures shown were obtained using a closed loop oil mist system delivering mineral oil mist at a velocity of 0.3cc / hr per inch (25mm) of shaft diameter. The bearings, bearing chamber and MagTecta-OM™ were soaked statically with oil mist for 24 hours before dynamic operation. The MagTecta-OM™ is also suitable for use with oil splash lubrication, especially at higher shaft speeds.

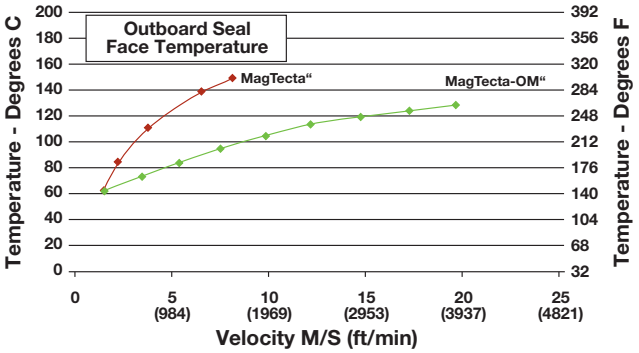
The graphs shown represent some of the worst case operating temperatures that can be expected from using the MagTecta™ product range.

Clearly, like all mechanical seals, performance ratings depend on a number of variables, not least the peripheral shaft speed, lubrication regime, equipment position, volume and type of lubricant as well as ambient temperature.

Velocity v Temperature Graph
(@18ºC / 65ºF Amb.) for Totally Dry Running



Velocity v Temperature Graph
(@18ºC / 65ºF Amb.) for Oil Splash (marginal lubrication)

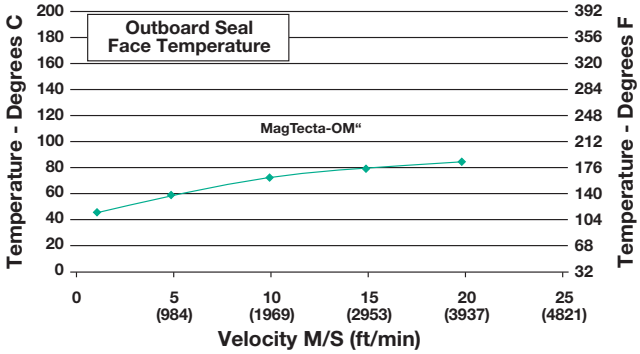


Maximum shaft speeds for Oil Splash (marginal lubrication) applications

MagTecta™ < 3.937” (100mm) = 3,000 rpm or 7.8 m/s (whichever is achieved first)
MagTecta™ > 3.937” (100mm) = 750 rpm or 4 m/s (whichever is achieved first)
MagTecta-OM™ < 4.062” (105mm) = 3,600 rpm or 20 m/s (whichever is achieved first)
MagTecta-OM™ > 4.062” (105mm) = 1,800 rpm

MagTecta™ and MagTecta-OM™ products are face seals and as such operate on a fluid film. Similarly to mechanical seals, they may exhibit slight leakage (up to 1.0cc (0.060 inch³) per hour) during a bedding in period. This may or may not reduce with time.

Velocity v Temperature Graph
(@18ºC / 65ºF Amb.) for Oil Mist Lubrication



Maximum shaft speeds for Oil Mist applications

MagTecta-OM™ < 4.062” (105mm) = 3,600 rpm or 20 m/s (whichever is achieved first)
MagTecta-OM™ > 4.062” (105mm) = 1,800 rpm

These graphs are for guidance only. Contact the bearing protection department for exact parameters.

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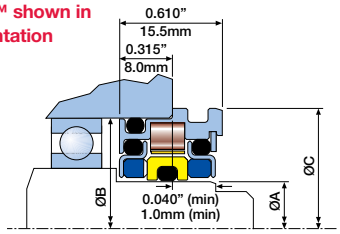
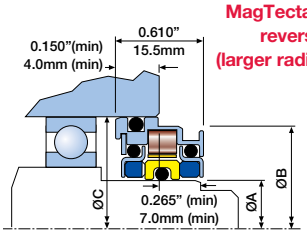
MagTecta™ Dimensions

MagTecta-OM™ shown in normal (N) orientation



MagTecta-OM™ shown in diagrams for reference.

MagTecta™ may be used with a stepped shaft provided minimum dimensions are met.



MagTecta-OM™ shown in reverse (R) orientation (larger radial cross section)

TXS / TXN / TXR (inches)

DIM A	DIM B	DIM C
0.750	1.500	1.625
0.875	1.625	1.750
0.937	1.687	1.812
1.000	1.750	1.875
1.062	1.812	1.937
1.125	1.875	2.000
1.187	1.937	2.062
1.250	2.000	2.125
1.312	2.062	2.187
1.375	2.125	2.250
1.437	2.187	2.312
1.500	2.250	2.375
1.562	2.312	2.437
1.625	2.375	2.500
1.687	2.437	2.562
1.750	2.500	2.625
1.812	2.562	2.687
1.875	2.625	2.750
1.937	2.687	2.812
2.000	2.750	2.875
2.062	2.812	2.937
2.125	2.875	3.000
2.187	2.937	3.062
2.250	3.000	3.125
2.312	3.062	3.187
2.375	3.125	3.250
2.437	3.187	3.312
2.500	3.250	3.375
2.562	3.312	3.437
2.625	3.375	3.500
2.687	3.437	3.562
2.750	3.500	3.625
2.812	3.562	3.687
2.875	3.625	3.750
2.937	3.687	3.812
3.000	3.750	3.875
3.062	3.812	3.937
3.125	3.875	4.000
3.187	3.937	4.062
3.250	4.000	4.125
3.312	4.062	4.187
3.375	4.125	4.250
3.437	4.187	4.312
3.500	4.250	4.375
3.562	4.312	4.437
3.625	4.375	4.500
3.687	4.437	4.562
3.750	4.500	4.625
3.812	4.562	4.687
3.875	4.625	4.750
3.937	4.687	4.812
4.000	4.750	4.875
4.062	4.812	4.937
4.125	4.875	5.000
4.187	4.937	5.062
4.250	5.000	5.125
4.312	5.062	5.187
4.375	5.125	5.250
4.437	5.187	5.312
4.500	5.250	5.375
4.562	5.312	5.437
4.625	5.375	5.500
4.687	5.437	5.562
4.750	5.500	5.625
4.812	5.562	5.687
4.875	5.625	5.750
4.937	5.687	5.812
5.000	5.750	5.875
5.125	5.875	6.000
5.250	6.000	6.125
5.375	6.125	6.250
5.500	6.250	6.375
5.625	6.375	6.500
5.750	6.500	6.625
5.875	6.625	6.750

TXS / TXN / TXR (mm)

DIM A	DIM B	DIM C
16.0	36.0	41.0
18.0	38.0	43.0
20.0	40.0	45.0
22.0	42.0	47.0
24.0	44.0	49.0
25.0	45.0	50.0
28.0	48.0	53.0
30.0	50.0	55.0
32.0	52.0	57.0
33.0	53.0	58.0
35.0	55.0	60.0
38.0	58.0	63.0
40.0	60.0	65.0
43.0	63.0	68.0
45.0	65.0	70.0
48.0	68.0	73.0
50.0	70.0	75.0
52.0	72.0	77.0
53.0	73.0	78.0
55.0	75.0	80.0
58.0	78.0	83.0
60.0	80.0	85.0
63.0	83.0	88.0
65.0	85.0	90.0
68.0	88.0	93.0
70.0	90.0	95.0
75.0	95.0	100.0
80.0	100.0	105.0
85.0	105.0	110.0
90.0	110.0	115.0
95.0	115.0	120.0
100.0	120.0	125.0
105.0	125.0	130.0
110.0	130.0	135.0
115.0	135.0	140.0
120.0	140.0	145.0
125.0	145.0	150.0
130.0	150.0	155.0
135.0	155.0	160.0
140.0	160.0	165.0
145.0	165.0	170.0

MagTecta™ and MagTecta-OM™ options are available

0.750" (16.0mm) to 4.000" (100mm) shaft diameter.

LXS / LXN / LXR (mm)

DIM A	DIM B	DIM C
16.0	34.0	38.0
18.0	36.0	40.0
20.0	38.0	42.0
22.0	40.0	44.0
24.0	42.0	46.0
25.0	43.0	47.0
28.0	46.0	50.0
30.0	48.0	52.0
32.0	50.0	54.0
33.0	51.0	55.0
35.0	53.0	57.0
38.0	56.0	60.0
40.0	58.0	62.0
43.0	61.0	65.0
45.0	71.0	75.0
48.0	74.0	78.0
50.0	76.0	80.0
52.0	78.0	82.0
53.0	79.0	83.0
55.0	81.0	85.0
58.0	84.0	88.0
60.0	86.0	90.0
63.0	89.0	93.0
65.0	91.0	95.0
68.0	94.0	98.0
70.0	96.0	100.0
75.0	101.0	105.0
80.0	106.0	110.0
85.0	111.0	115.0
90.0	116.0	120.0
95.0	121.0	125.0
100.0	126.0	130.0
105.0	131.0	135.0
110.0	136.0	140.0
115.0	141.0	145.0
120.0	146.0	150.0
125.0	151.0	155.0
130.0	156.0	160.0
135.0	161.0	165.0
140.0	166.0	170.0
145.0	171.0	175.0

LXS / LXN / LXR (inches)

DIM A	DIM B	DIM C
0.750	1.750	1.875
0.875	1.875	2.000
0.937	1.937	2.062
1.000	2.000	2.125
1.062	2.062	2.187
1.125	2.125	2.250
1.187	2.187	2.312
1.250	2.250	2.375
1.312	2.312	2.437
1.375	2.375	2.500
1.437	2.437	2.562
1.500	2.500	2.625
1.562	2.562	2.687
1.625	2.625	2.750
1.687	2.687	2.812
1.750	2.750	2.875
1.812	2.812	2.937
1.875	2.875	3.000
1.937	2.937	3.062
2.000	3.000	3.125
2.062	3.062	3.187
2.125	3.125	3.250
2.187	3.187	3.312
2.250	3.250	3.375
2.312	3.312	3.437
2.375	3.375	3.500
2.437	3.437	3.562
2.500	3.500	3.625
2.562	3.562	3.687
2.625	3.625	3.750
2.687	3.687	3.812
2.750	3.750	3.875
2.812	3.812	3.937
2.875	3.875	4.000
2.937	3.937	4.062
3.000	4.000	4.125
3.062	4.062	4.187
3.125	4.125	4.250
3.187	4.187	4.312
3.250	4.250	4.375
3.312	4.312	4.437
3.375	4.375	4.500
3.437	4.437	4.562
3.500	4.500	4.625
3.562	4.562	4.687
3.625	4.625	4.750
3.687	4.687	4.812
3.750	4.750	4.875
3.812	4.812	4.937
3.875	4.875	5.000
3.937	4.937	5.062
4.000	5.000	5.125
4.062	5.062	5.187
4.125	5.125	5.250
4.187	5.187	5.312
4.250	5.250	5.375
4.312	5.312	5.437
4.375	5.375	5.500
4.437	5.437	5.562
4.500	5.500	5.625
4.562	5.562	5.687
4.625	5.625	5.750
4.687	5.687	5.812
4.750	5.750	5.875
4.812	5.812	5.937
4.875	5.875	6.000
4.937	5.937	6.062
5.000	6.000	6.125
5.125	6.125	6.250
5.250	6.250	6.375
5.375	6.375	6.500
5.500	6.500	6.625
5.625	6.625	6.750
5.750	6.750	6.875
5.875	6.875	7.000

Only the MagTecta™ option is available for 4.062" (105mm) to 5.875" (145mm) shaft diameters.

For larger MagTecta-OM™ sizes see next page.

Not all sizes are inventoried.
Contact the MagTecta™ team for details

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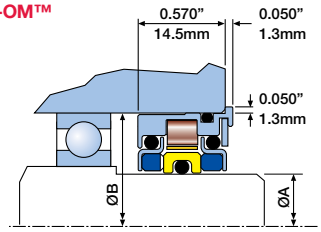
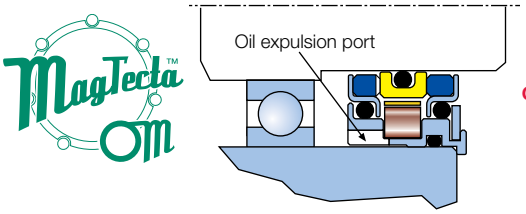
Fax: +1 865 531 0571

MagTecta™ Dimensions 4.125” (105mm) and above

MagTecta-OM™





MagTecta-OM™ showing oil expulsion port

Oil expulsion port must be at a “6 o’clock” position

Dimensions (mm)

DIM A	DIM B
105.0	125.0
	130.0
	131.0
	135.0
110.0	130.0
	135.0
	136.0
	140.0
115.0	135.0
	140.0
	141.0
	145.0
120.0	140.0
	145.0
	146.0
	150.0
125.0	145.0
	150.0
	151.0
	155.0
130.0	150.0
	155.0
	156.0
	160.0
135.0	155.0
	160.0
	161.0
	165.0
140.0	160.0
	165.0
	166.0
	170.0
145.0	165.0
	170.0
	171.0
	175.0

Dimensions (inches)

DIM A	DIM B
4.062	4.812
	4.937
	5.062
	5.187
4.125	4.875
	5.000
	5.125
	5.250
4.187	4.937
	5.062
	5.187
	5.312
4.250	5.000
	5.125
	5.250
	5.375
4.312	5.062
	5.187
	5.312
	5.437
4.375	5.125
	5.250
	5.375
	5.500
4.437	5.187
	5.312
	5.437
	5.562
4.500	5.250
	5.375
	5.500
	5.625
4.562	5.312
	5.437
	5.562
	5.687
4.625	5.375
	5.500
	5.625
	5.750
4.687	5.437
	5.562
	5.687
	5.812
4.750	5.500
	5.625
	5.750
	5.875

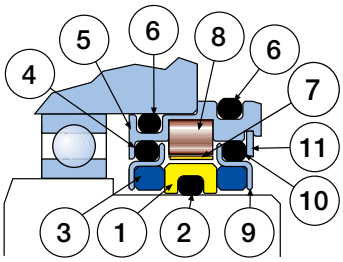
Dimensions (inches)

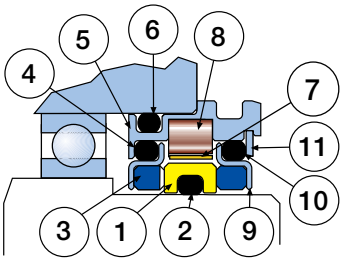
DIM A	DIM B
4.812	5.562
	5.687
	5.812
	5.937
4.875	5.625
	5.750
	5.875
	6.000
4.937	5.687
	5.812
	5.937
	6.062
5.000	5.750
	5.875
	6.000
	6.125
5.125	5.875
	6.000
	6.125
	6.250
5.250	6.000
	6.125
	6.250
	6.375
5.375	6.125
	6.250
	6.375
	6.500
5.500	6.250
	6.375
	6.500
	6.625
5.625	6.375
	6.500
	6.625
	6.750
5.750	6.500
	6.625
	6.750
	6.875
5.875	6.625
	6.750
	6.875
	7.000

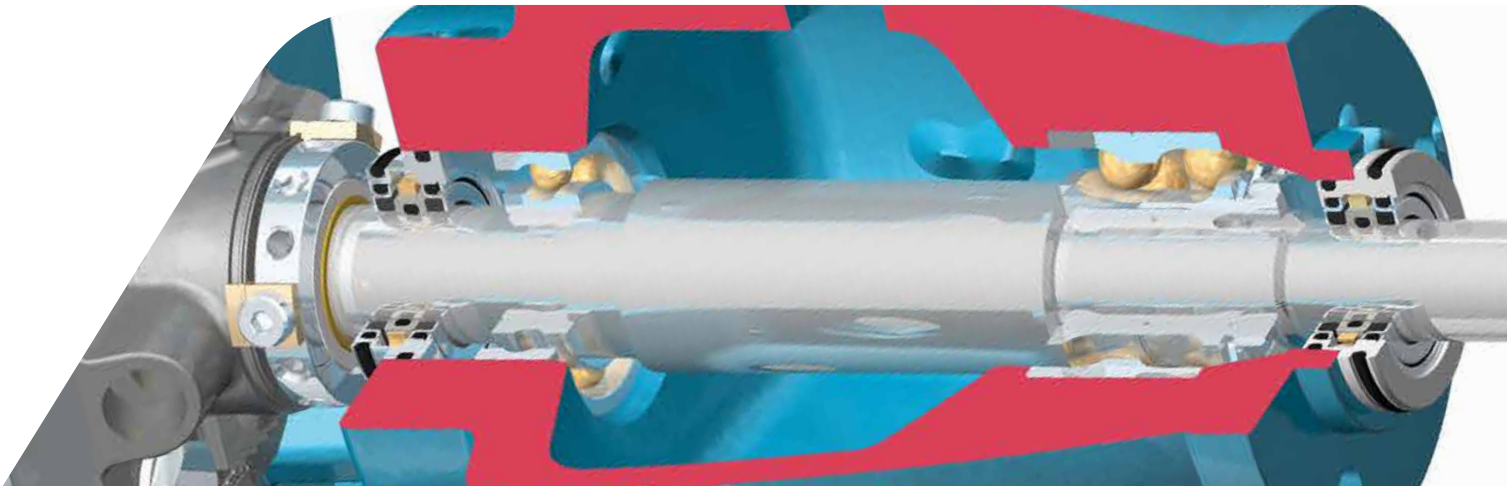
MagTecta™ Range Parts List

Item	Description	Material
1	Rotary Seal Face	Tungsten Carbide
2	Rotary Elastomer	FKM / EPR / FFKM / TFE/P
3	Stationary Seal Face Assy	Ant.Car-S/S
4	Stationary Elastomer	FKM / EPR / *FFKM
5	Outer Body	Stainless Steel
6	Outer Body Elastomer	FKM / EPR / FFKM / TFE/P
7	Shroud	Phosphor Bronze
8	Magnet	Metal
9	Stationary Seal Face Assy	Ant.Car-S / S
10	Stationary Elastomer	FKM / EPR / *FFKM
11	Circlip	Stainless Steel

* Items 4 and 10 are available in FFKM from inventory





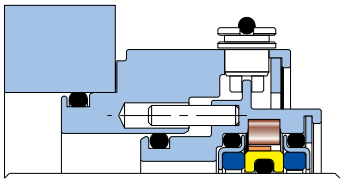


MagTecta™ — Large, Small and Special Designs

Axial Movement Designs — MagTecta-AX™

The MagTecta-AX™ range is designed specifically to suit applications that are subject to axial movement up to +/- 0.100” (2.5mm).

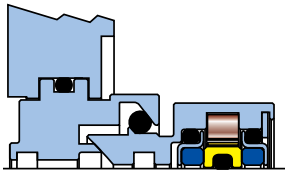
The range is ideally suited for applications with shaft thermal growth. Larger axial movement can be accommodated.



Self Aligning Pillow / Plummer Block Design

This design, available in all product types, is fitted in a self aligning housing to suit a Pillow / Plummer Block.

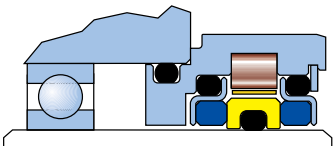
The patent pending self aligning feature ensures that the MagTecta™ range will accept some degree of angular misalignment as typically found with certain bearing types.



Thin Profile MagTecta™ Designs

The MagTecta™ range can be supplied to suit applications in which a standard product cannot be installed.

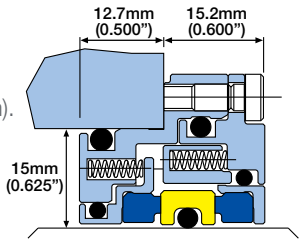
Special MagTectas, for very thin radial cross sectional spaces as small as 0.197” (5mm), can be designed.



The Large MagTecta™ Range

The sizes shown in the diagram (right) are consistent throughout the following size ranges: 6.000 - 11.000” (150.0 - 280.0mm).

Metric sizes are available in 5mm increments and imperial sizes are available in 0.125” increments.



> Eliminate the cause of over **50%** of bearing failures.

Research shows that 52% of bearing failures are due to contamination of the bearing oil. These represent 20.8% of all rotating equipment failures.

The MagTecta™ range comprises double face mechanical seals, but not fully functioning double mechanical seals. They are designed to seal marginally lubricated environments only and will not support a barrier fluid. a fully functional double mechanical seal should always be used with hazardous products.

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AESSEAL plc is certified to:

ISO 9001, ISO 14001, ISO/IEC 20000, ISO/IEC 27001, ISO/TS 29001, ISO 37001, ISO 45001 & ISO 50001

Use double mechanical seals with hazardous products.

Always take safety precautions:

WARNING

- **Guard your equipment**
- **Wear protective clothing**

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