HydroActive™ Bulkhead Seals
HydroActive™ Bulkhead Seals
Technology & operational need

**PRODUCT OPTIONS**

ISO 9001:2015 registered, Midé sells three types of bulkhead seals. All of our seals have been rigorously tested following US Naval and Class Certification guidelines.

**Reliant RM**
The Reliant RM range of bulkhead seals are cartridge or diaphragm replacements for ships that already have bulkhead seal housings. For these ships, Reliant RM seals offer a cost effective retrofit solution, along with all of the advantages and benefits of Midé HydroActive™ technology. Measurements on Reliant RM seals, installed on US Navy ships, concluded that the non-rotating seals offer superior wear performance over existing diaphragms that rotate with the shaft.

**Reliant YM**
Reliant YM is Midé’s next evolution seal design in which total system weight is reduced and maintenance is simplified. Instead of a housing, the Reliant YM series uses flat interface plates bolted to the bulkhead, on which the seal floats, to allow for large radial motions of the shaft. Reliant YM seals are installed and operating on many vessels.

**Omni**
Omni seals are designed for vessels that don’t have the large shaft radial deflections typically required for naval ships. With fewer components, the non-floating Omni seals are significantly less expensive, and easier to install and maintain.

**HYDROACTIVE™ TECHNOLOGY**
Foam with embedded hydrogel particles is the key technology that enables our HydroActive™ seals. The foam is placed inside a lip seal that is not normally in contact with the shaft. The hydrogel particles absorb water during a flooding event, and, as the particles swell, the foam pushes the lip seal into contact with the shaft - creating a water tight seal.

In summary, under normal operating conditions, no part of the seal is in contact with the shaft - allowing for unlimited shaft rotation speed without any seal wear. During a flooding event, the engaged lip seal still allows the shaft to rotate, allowing the ship to reach a safe haven.

**OPERATIONAL NEED**
Bulkhead seals are safety components on ships. Their purpose is to stop compartment-to-compartment flooding through the shaft opening in the bulkhead. Currently most bulkhead seals on the market are based on designs that are constantly contacting or have the seal spinning with the shaft. Due to radial and axial shaft motions, shaft run out, vibrations, poor shaft/bulkhead alignment, and air differential pressures these types of seals are unreliable and expensive to maintain. High installation and maintenance costs result in unacceptable seal life-cycle costs. Midé’s patented non-contacting HydroActive™ bulkhead seals are not in contact with the shaft until a flooding event occurs - essentially eliminating wear.

**Patents: United States**
- Fluid Activated Shaft Seal
  - 8,419,020 B2
  - 7,828,299 B2
- Bulkhead Seal
  - 8,608,172 B2

**Patents: International**
- Fluid Activated Shaft Seal
  - Europe – 1825173
  - Canada – 2588676
  - Australia – 2005327082
  - Hong Kong – HK1113190
  - South Korea – 10-1322338

**Class Certifications**
- ISO 9001:2015
- AS9100D
- SABS S10281
- 933496188
- 591X523655
- B75Q1651
Key HydroActive™ Features
Features & benefits

**Reduced Total Ownership Cost**
Midé’s line of bulkhead shaft seals have been designed using carefully chosen materials, and engineered to ensure they last the life of the vessel with little to no maintenance required. Midé’s HydroActive™ based designs have proven single vessel cost savings of nearly $100,000 per seal when comparing to existing competitors’ products and maintenance schedules that require costly part change outs every 3-5 years. This cost savings allows owners and operator to focus more on increasing profit, and less on maintenance and repair of safety equipment such as bulkhead seals.

**Improved Safety**
The non-contacting design enabled by hydrogel embedded foam actuator ensures the seal does not pre-maturely wear and works every time in an emergency.

**High Shaft Angle and Vertical Operation**
Unlike Midé’s non-contacting seals, conventional seals are likely to activate prematurely in vertical applications.

**Silent Sealing**

**Self-Resettable**

**Easy Customization**

**HYDROACTIVE™ BENEFITS**

**HYDROACTIVE™ KEY FEATURES**

- Non-Contacting Seal
- Floating Configuration
- Hydrogel Embedded Foam Actuation
- Split Design
- Lightweight
Reliant YM & RM Series
Complete assembly & retrofit models

**RELIANT KEY FEATURES & BENEFITS**

Non-contacting, non-rotating floating design
Can withstand large axial and radial shaft movements Up to 50mm of radial shaft deflection and unlimited axial deflection allowed

Self-centering seal

Utilizes HydroActive™ technology to engage seal

Shock & vibration qualified to military standards

Dirt excluder & emergency clamp ring
Provides backup seal

Components are lightweight & non corroding

Superior performance

Ready to integrate into military ships & boats

Retrofit solution
For Reliant RM models only

**RELIANT SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressures</td>
<td>Up to 30 psi (2 bar)</td>
</tr>
<tr>
<td>Shaft Surface Speed</td>
<td>Dry = Unlimited. Flooded = up to 82 ft/s (25 m/s)</td>
</tr>
<tr>
<td>Surface Finish Required</td>
<td>63 µ-inch or better (1.6 µ-meter)</td>
</tr>
<tr>
<td>Allowable Angular Misalignment</td>
<td>0.5 degrees</td>
</tr>
<tr>
<td>Leak Rate</td>
<td>Less than 1 US Pint per minute (473 mL/min)</td>
</tr>
<tr>
<td>Shaft Deflections</td>
<td>Up to 50mm, 1.97&quot; (zero to peak)</td>
</tr>
<tr>
<td>Key Features</td>
<td>Non-Contacting, Non-Rotating, Reusable</td>
</tr>
<tr>
<td>Approvals</td>
<td>NAVSEA, MIL-S-901D, MIL-STD-167-1A, ABS, DNV-GL</td>
</tr>
</tbody>
</table>
Standard Reliant Dimensions
Shaft diameters from 100mm - 1,000mm

Our HydroActive™ design can be engineered to meet your sealing needs.
Contact Midé Today!

ORDERING INFORMATION
PN: 110 - XXX - 20

<table>
<thead>
<tr>
<th>P/N Part Number</th>
<th>Shaft Diameter</th>
<th>Lip Seal ID</th>
<th>PTFE ID</th>
<th>Overall Width</th>
<th>Outside Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-111-300</td>
<td>127.0</td>
<td>130.6</td>
<td>129.5</td>
<td>80.3</td>
<td>431.8</td>
</tr>
<tr>
<td>100-113-300</td>
<td>225.0</td>
<td>240.5</td>
<td>227.3</td>
<td>89.2</td>
<td>579.1</td>
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<tr>
<td>100-104-300</td>
<td>254.0</td>
<td>259.8</td>
<td>256.5</td>
<td>256.0</td>
<td>565.0</td>
</tr>
<tr>
<td>100-104-400</td>
<td>283.0</td>
<td>288.8</td>
<td>285.5</td>
<td>253.5</td>
<td>595.0</td>
</tr>
<tr>
<td>100-104-500</td>
<td>321.0</td>
<td>326.6</td>
<td>323.6</td>
<td>253.5</td>
<td>635.0</td>
</tr>
<tr>
<td>110-400-36-400</td>
<td>400.0</td>
<td>417.1</td>
<td>401.1</td>
<td>268.2</td>
<td>785.0</td>
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<tr>
<td>100-101-400</td>
<td>511.2</td>
<td>532.8</td>
<td>512.2</td>
<td>288.5</td>
<td>1063.6</td>
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<tr>
<td>100-103-300</td>
<td>760.0</td>
<td>795.8</td>
<td>765.6</td>
<td>299.7</td>
<td>1264.0</td>
</tr>
</tbody>
</table>

Dimensions - all dimensions are in mm.

Note: The sizing above represents Midé standard designs, other sizing is available.
Omni Series
Cost effective HydroActive™ Solutions

OMNI KEY FEATURES & BENEFITS

Utilizes HydroActive™ technology to engage seal

Simple non-floating static design
Can be used in applications where radical motion is less than 10mm.

Simplified shipboard installation

Lower part count

Lower procurement cost

HYDROACTIVE™ TECHNOLOGY

Military and Commercial Vessels: Omni seals have designs and sizes that meet the requirements of a wide range of military and commercial vessels.

Composite Shaft Systems: Omni seals reduce the potential for shaft damage or grooving to composite shafts, which may result from a constantly contacting seal - making them an optimal solution for use with lightweight composite shafts.

Cardan Shafts: Omni seals allow for the typical radial run out of the intermediate shaft between the universal joints of the cardan shaft - the only technically sound solution for a reliable bulkhead seal for cardan shafts.

Drawn Over Mandrel Shafting: Omni seals have been successfully tested to seal on shafts with high out of round values. Due to their non-contacting design, there is no need to machine a shaft to a desired roundness.

Pump Shaft Applications: Omni seals can be used to seal bulkheads around all types of rotating equipment, even pump shafts, without the risk of the equipment burning up the seal. The non-contacting design ensures that seals only contact rotating equipment when you need them - protecting them against premature failure from wear.

High RPM Shafts: Midé’s HydroActive™ seals can withstand large radial and axial shaft motions due to their non-contacting design - making them ideal for high speed shaft applications with high frequency shaft motions.

Vertical Shaft Applications: Since they are unaffected by gravity, Omni seals are ideally suited to vertical shaft applications due to their non-contacting design. Spinning seals will typically activate when aligned, or at an angle to the gravity vector - leading to premature wear and failure.

OMNI SPECIFICATIONS

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## Standard Omni Dimensions
Shaft diameters from 50mm - 1,000mm

Our HydroActive™ design can be engineered to meet your sealing needs. Contact Midé Today!

### ORDERING INFORMATION

**PN: 900 - XXX**

<table>
<thead>
<tr>
<th>Shaft Diameter</th>
<th>Lip Seal ID</th>
<th>Hard Part Clearance</th>
<th>Overall Width</th>
<th>Flange Offset</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-150</td>
<td>XXX + 4</td>
<td>XXX + 20</td>
<td>44.0</td>
<td>8.4</td>
</tr>
<tr>
<td>151-1000</td>
<td>XXX + 6</td>
<td>XXX + 204</td>
<td>44.0</td>
<td>8.4</td>
</tr>
</tbody>
</table>

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Origins
Midé's HydroActive™ Seal

Midé Technology Corporation is an engineering company that excels in the development of advanced engineering components and systems. After the United States Navy Destroyer USS Cole (DDG 67), was attacked in Yemen in 2000, and a compartment was flooded when a bulkhead seal failed, the United States Navy sought a better bulkhead seal design to protect its fleet and sailors.

Through a Navy small business innovative research (SBIR) award, the Navy funded Midé to develop a novel approach to solving the bulkhead seal problem. The HydroActive™ bulkhead seal was the outcome of this multi-year development program.

Today Midé offers a turn-key solution to bulkhead seal systems, with the analytical and experimental facilities to develop new designs for unique marine applications and to analyze, test and validate that the design will perform according to customer requirements. Midé’s quality assurance standards and procedures have been reviewed and approved by large OEM customers and Midé has been assessed and approved by National Quality Assurance, U.S.A., against the provisions of: ISO 9001: 2015.

QUALIFIED SERVICE PROVIDER
Midé provides unparalleled customer service and support throughout the life of its marine products.
• A professional team with an extensive repertoire of skills and expertise
• Delivering support, installation, inspection, and maintenance
• Managing complex efforts at U.S. shipyards and abroad
• Turnkey Installation
• Field Testing
• Rigging
• Alignment
• Vibration Analysis

CONTACT INFORMATION
Midé - ISO 9001:2015
200 Boston Avenue, Suite 1000
Medford, MA 02155, USA

Phone: +1 781-933-1588
Fax: +1 781-306-0619

Web: www.mide.com/seals
Email: hydroactiveseals@mide.com