



MARINE

Propulsion Sealing Solutions

Bulkhead Seals

We make it ***possible***



HydroActive™ Bulkhead Seals

Technology & operational need

PRODUCT OPTIONS

ISO 9001:2015 registered, Hutchinson sells three types of bulk-head 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 bulk-head seal housings. For these ships, Reliant RM seals offer a cost effective retrofit solution, along with all of the advantages and benefits of Hutchinson's 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 the next evolution seal design in which total system weight is reduced and maintenance is simplified. In-stead 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.

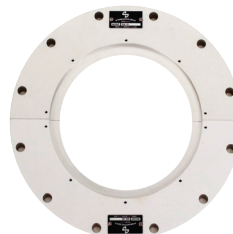
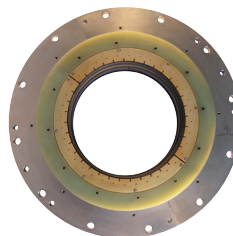
Patents: United States

Fluid Activated Shaft Seal
8,419,020 B2
7,828,299 B2
Bulkhead Seal
8,608,172 B2

Patents: International

Europe – 1825173
Canada – 2588676
Australia – 2005327082
Hong Kong – HK1113190
South Korea – 10-1322338

Class Certifications



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

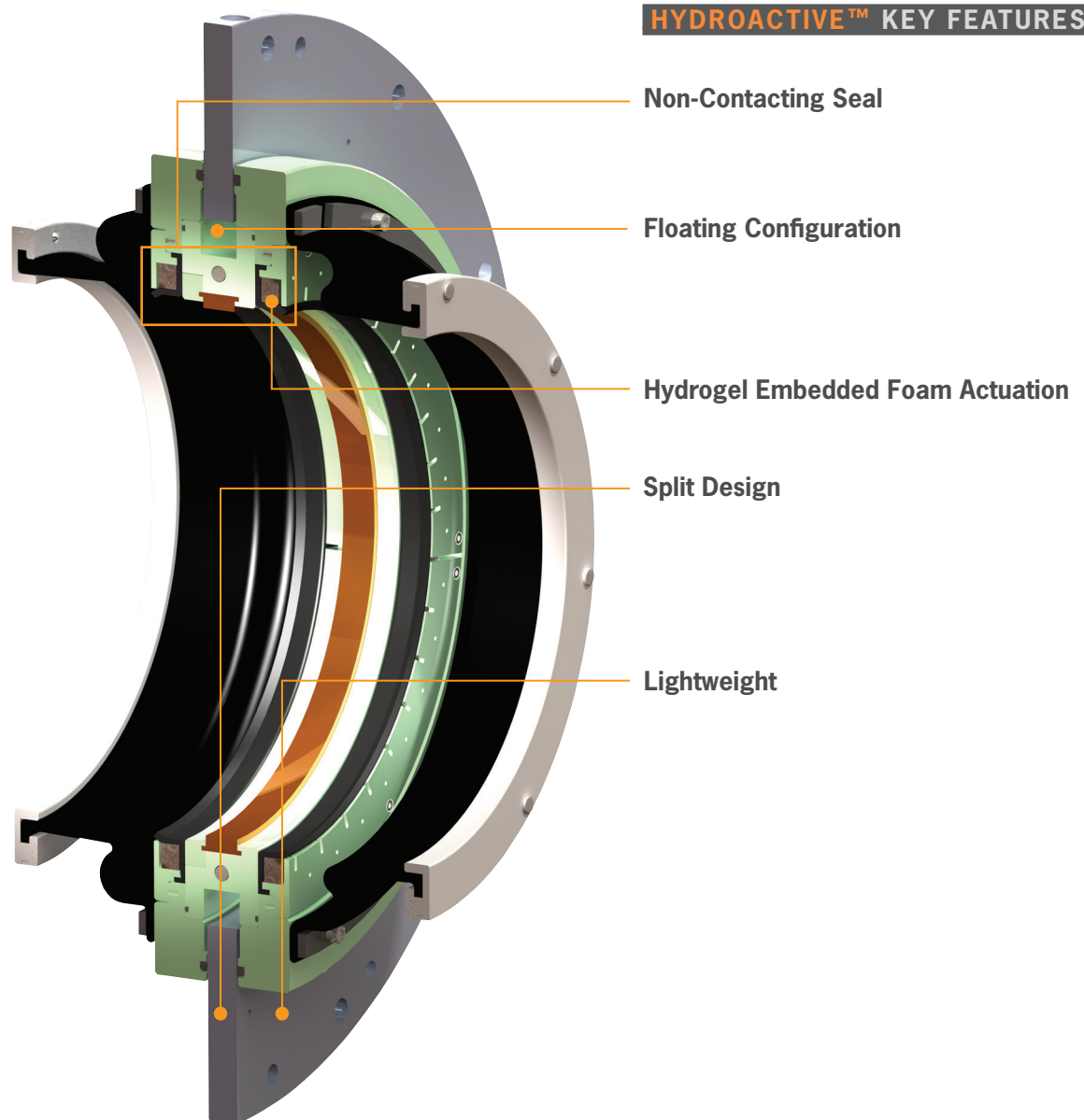
Bulkhead seals are safety components on ships. Their purpose is to stop compartment-to-compartment flooding through the shaft opening in the bulkhead. Currently most bulkhead seals on the market are based on designs that are constantly contacting or have the seal spinning with the shaft. Due to radial 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. Hutchinson's patented non-contacting HydroActive™ bulkhead seals are not in contact with the shaft until a flooding event occurs - essentially eliminating wear.

Key HydroActive™ Features

Features & benefits

HYDROACTIVE™ BENEFITS

- **Reduced Total Ownership Cost**
Hutchinson'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. Hutchinson'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 Hutchinson's non-contacting seals, conventional seals are likely to activate prematurely in vertical applications.
- **Silent Sealing**
- **Self-Resettable**
- **Easy Customization**



Reliant YM & RM Series

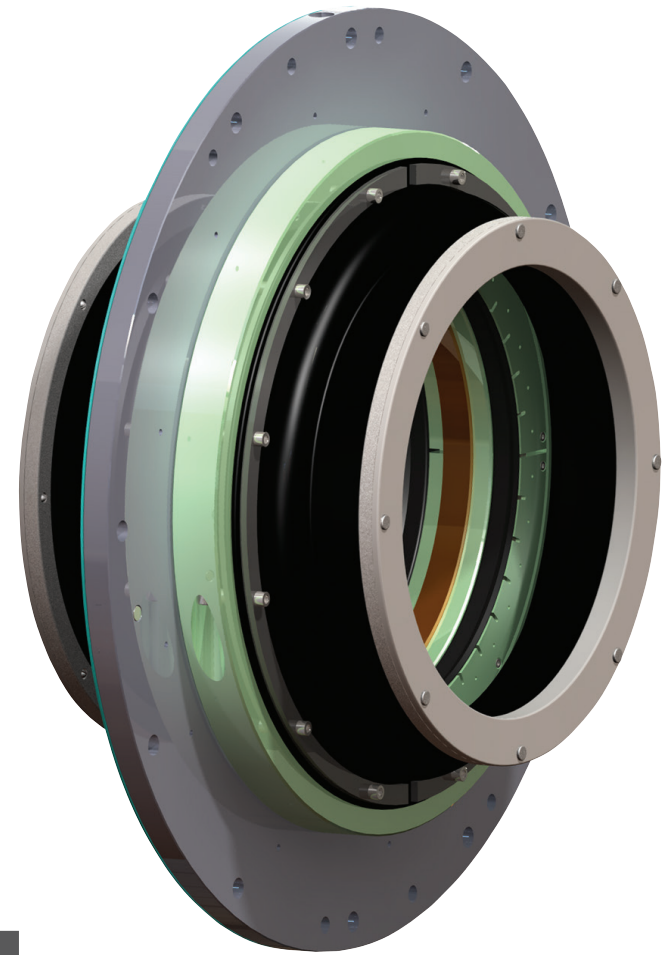
Complete assembly & retrofit models

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 de-flection 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

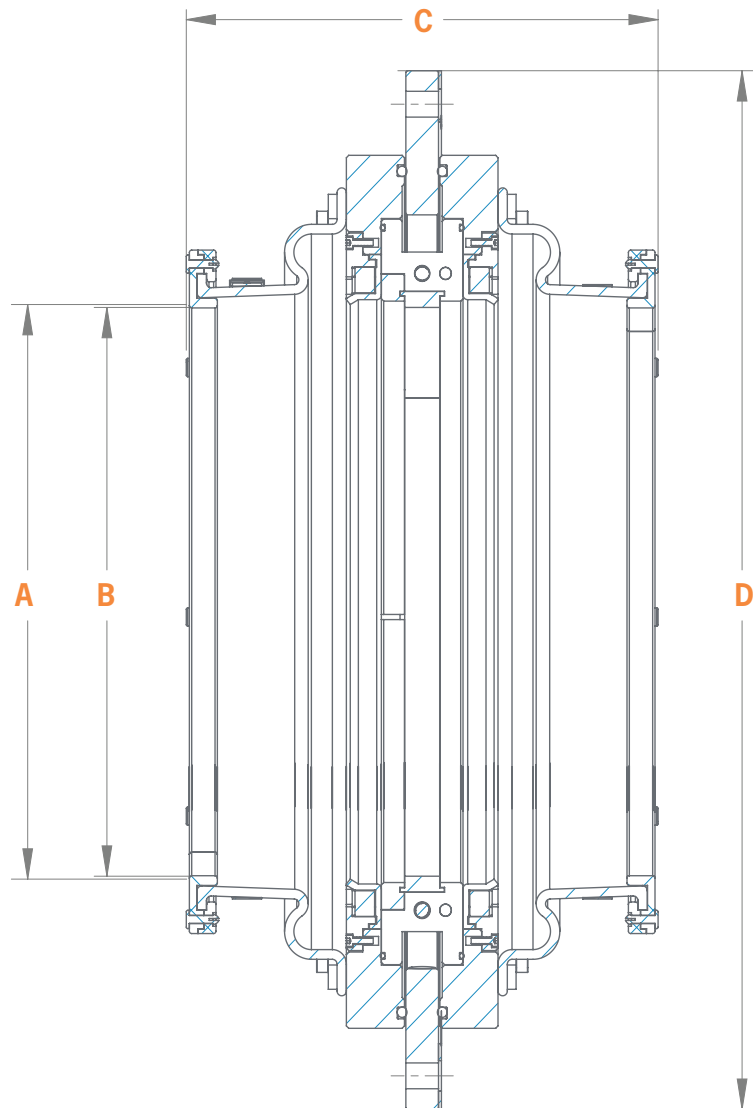
RELIANT SPECIFICATIONS

Operating Pressures	Up to 30 psi (2 bar)
Shaft Surface Speed	Dry = Unlimited. Flooded = up to 82 ft/s (25 m/s)
Surface Finish Required	63 µ-inch or better (1.6 µ-meter)
Allowable Angular Misalignment	0.5 degrees
Leak Rate	Less than 1 US Pint per minute (473 mL/min)
Shaft Deflections	Up to 50mm, 1.97" (zero to peak)
Key Features	Non-Contacting, Non-Rotating, Reusable
Approvals	NAVSEA, MIL-S-901D, MIL-STD-167-1A, ABS, DNV-GL



Standard Reliant Dimensions

Shaft diameters from 100mm - 1,000mm



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

ORDERING INFORMATION

PN: 110 - XXX - 20

Reliant Shaft Allowable
YM Diameter Travel

Dimensions - all dimensions are in mm.

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

Note: The sizing above represents standard designs, other sizing is available.

Reliant Series HD

High Radial Displacement Bulkhead Shaft Seals

RELIANT KEY FEATURES & BENEFITS

- **Non-contacting, non-rotating floating design**
Can withstand large axial and radial shaft movements
Up to 100mm 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 or dust exclusion skirt**
Provides added protection to sealing surfaces and an available emergency back up seal
- **Lightweight materials combined with advanced material coatings offer long life and limited corrosion**
- **Superior performance**

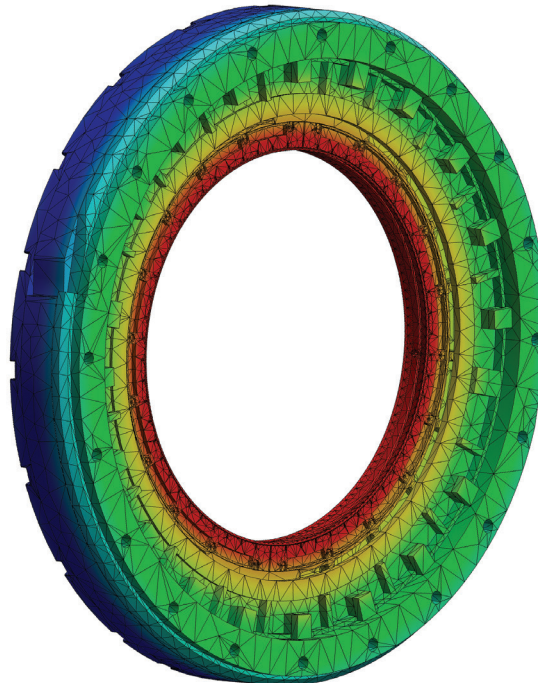
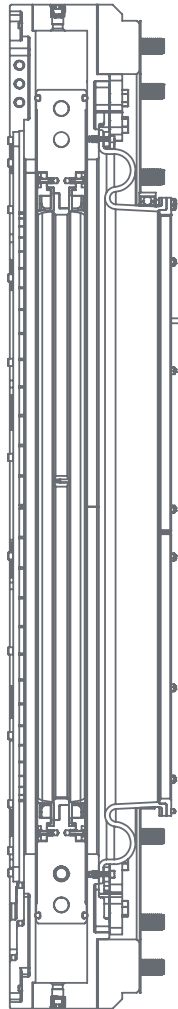
RELIANT HD SPECIFICATIONS

Operating Pressures	Up to 30 psi (2 bar)
Shaft Surface Speed	Dry = Unlimited. Flooded = up to 82 ft/s (25 m/s)
Surface Finish Required	63 µ-inch or better (1.6 µ-meter)
Allowable Angular Misalignment	0.5 degrees
Leak Rate	Less than 1 US Pint per minute (473 mL/min)
Shaft Deflections	Up to 100mm, [3.9"] (zero to peak)
Key Features	Non-Contacting, Non-Rotating, Reusable
Approvals	NAVSEA, MIL-S-901D, MIL-STD-167-1A, ABS, DNV



Reliant HD Dimensions

Shaft diameters from 100mm - 1,000mm



Reliant HD configurations are fully custom to your application. Contact our team for sizing information!

Retrofit-able to existing bulkheads or bespoke designs for new construction applications

Omni Series

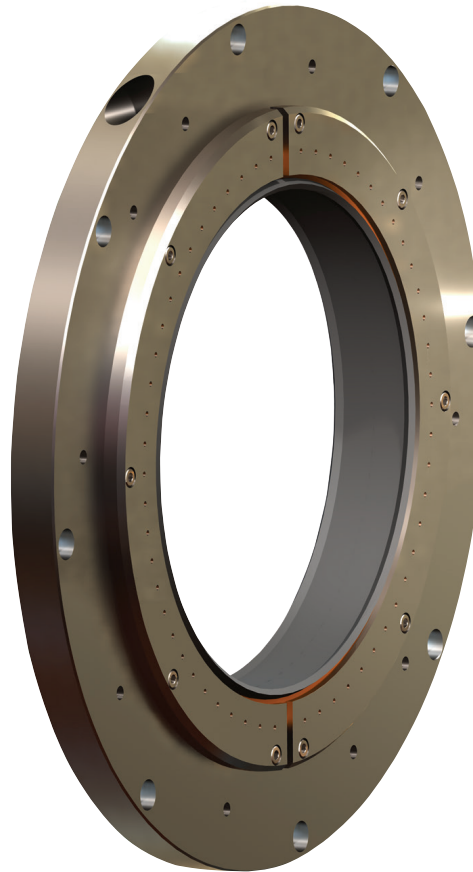
Cost effective HydroActive™ Solutions

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

OMNI SPECIFICATIONS

Operating Pressures	Up to 30 psi (2 bar)
Shaft Surface Speed	Dry = Unlimited. Flooded = up to 82 ft/s (25 m/s)
Surface Finish Required	63 µ-inch or better (1.6 µ-meter)
Allowable Angular Misalignment	0.5 degrees
Leak Rate	Less than 1 US Pint per minute (473 mL/min)
Shaft Deflections	Up to 10mm, 0.4" (zero to peak)
Key Features	Non-Contacting, Non-Rotating, Reusable, Cost Effective
Approvals	ABS, DNV-GL



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.

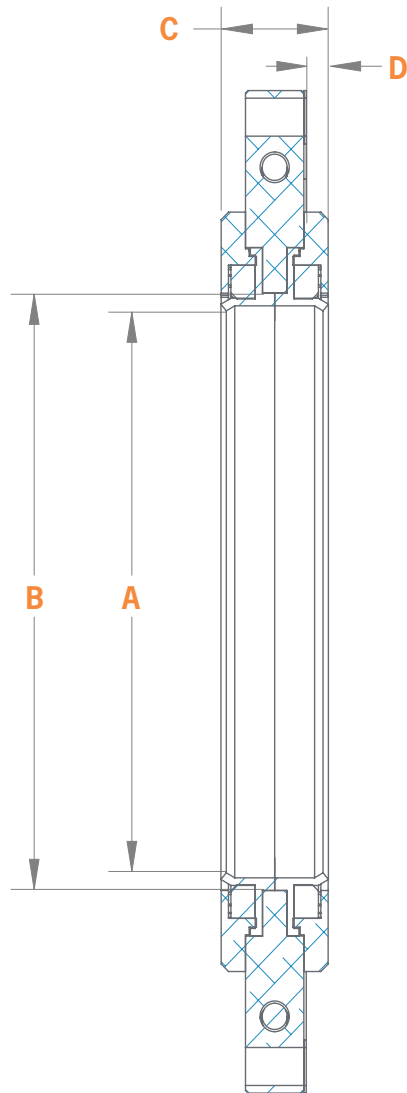
Pump Shaft Applications: Omni seals can be used to seal bulkheads around all types of rotating equipment, even pump shafts, without the risk of the equipment burning up the seal. The non-contacting design ensures that seals only contact rotating equipment when you need them - protecting them against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

High RPM Shafts: 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.

Standard Omni Dimensions

Shaft diameters from 50mm - 1,000mm



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

ORDERING INFORMATION

PN: 900 - XXX
Omni Shaft
Diameter

Dimensions - all dimensions are in mm.

XXX	A	B	C	D
Shaft Diameter	Lip Seal ID	Hard Part Clearance	Overall Width	Flange Offset
50-150	XXX + 4	XXX + 20	44.0	8.4
151-1000	XXX + 6	XXX + 204	44.0	8.4

Note: The sizing above represents Hutchinson's standard designs, other sizing is available.

Commercial Craft & Small Boats

Markets & Applications

Hutchinson's Marine Propulsion Sealing Solutions are well suited for commercial and civil applications on vessels where any type of drive shaft runs through a bulkhead.

Omni Series Seals are typically sourced for these types of applications where shock ratings are not required, though the customer still demands safety, reliability, and unparalleled customer service.

Some customers have more demanding applications and may require one of the Reliant Series options to meet their specification. No matter the challenge, Hutchinson Bulkhead Shaft Seals are purpose built to keep crew and vessel safe.

MARKETS & APPLICATIONS

- Tugs
- Ferries
- Dredge (Pump & Propulsion)
- Offshore Wind Support OSVs
- Military Patrol Boats
- Coast Guard
- Fishing & Processor Vessel Ice Breakers



Military & Harsh Environment Vessels

Markets & Applications

Whether for large platform surface combatants, or small coastal patrol vessels, the entire line of Bulkhead Shaft Sealing products across both our Reliant Series and Omni Series can be suited to meet the demand.

Large surface combatants operating in harsh environments and requiring Mil-Standard or other shock ratings rely on Reliant Series YM and Reliant Series HD seals to perform where others cannot.

Where smaller coastal patrol vessels do not have the same shock requirements, but still demand performance and longevity, those vessels rely on Omni Series to get the job done. From brown water to blue water, Hutchinson's Marine Propulsion Sealing Solutions are there when you need them most

MILITARY APPLICATIONS

- Surface Combatants
- Ice Breakers
- Coast Guard
- Mine Sweepers
- Crew Vessels
- Support & Reconnaissance Vessels
- Unmanned Vessels
- Amphibious Vessels



Origins

HydroActive™ Seal

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 Hutchinson 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 Hutchinson 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. Hutchinson's quality assurance standards and procedures have been reviewed and approved by large OEM customers and Hutchinson has been assessed and approved by National Quality Assurance, U.S.A., against the provisions of: ISO 9001: 2015.



QUALIFIED SERVICE PROVIDER

Hutchinson 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

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