



# YOU'RE GONNA NEED A BIGGER BOOT

Sealing Solutions from APM Hexseal





Exposure to environmental substances—such as water, chemicals, dirt, and salt—can cause significant damage to electronic equipment and systems. Depending on the system and the contaminant, contact can trigger system outages or lead to complete system failure. Either of these conditions leads to unplanned downtime, increased equipment costs, and loss of profits. For many industrial electronic control systems, especially those employed in marine environments, sealing boots provide a solution to these issues and still allow the switch to function and actuate as intended. Properly protecting these vulnerable electronic and mechanical systems, ensuring their continued operation, is crucial to the safe navigation of the world's waterways.

Sealing boots are devices that protect the internal and external components of an electronic system. They are used in a variety of marine applications, including military destroyers, commercial fishing boats, and deep-sea submarines. In these extreme environments, sealing boots maintain the integrity of sensitive electronic components by sealing stuff out and protect vulnerable ecosystems by sealing stuff in.

## Seal Stuff Out of Sensitive Marine Electronics

Today's marine vessels use high-tech electronic systems to plot their course, control operating equipment in various parts of the vessel, monitor and protect against external conditions such as weather and rough seas, and keep internal environments safe and comfortable for crew members and cargo. To maintain optimal performance in these systems, marine vessel and equipment manufacturers employ sealing boots to:



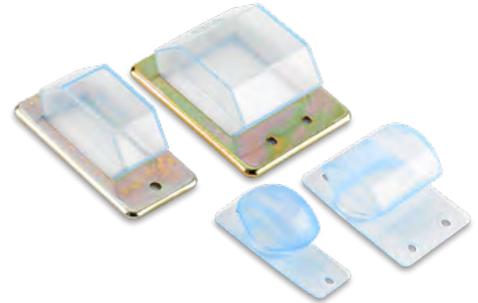
- **Provide corrosion protection.** Water and salt can cause sensitive electronic components to corrode. This internal damage can lead to malfunctions that put lives and equipment at risk. Sealing equipment on marine vessels prevents these contaminants from entering.
- **Prevent contamination.** In production and storage environments, lubricant, dust, oils, solvents, grease, and other environmental substances can make their way into internal electronic mechanisms. If the build-up is left unresolved, this could interfere with functionality and result in system outages or failure. Marine sealing fasteners keep these unwanted substances from damaging electronic equipment, which could lead to catastrophic failure in mission critical environments.
- **Avoid overloads and short circuiting.** Short circuits and electrical overloads can cause irreversible damage in electronic systems. Sealing boots made with non-conductive materials reduce the transfer of electrical energy, which safeguards electronics from a complete meltdown.
- **Extend equipment service life.** Nothing lasts forever. This is especially true of delicate electronic system components. However, the addition of a marine sealing fastener can increase the service life of electronic components, such as breakers.
- **Ensure long-term system security.** As outlined above, sealing boots can provide various protections to different components of an electronic system. Together, these qualities help to ensure the integrity of the overall system.

## Types of Sealing Boots

At APM Hexseal, we manufacture a variety of different types of boots designed to protect various electronic components in marine systems, while still allowing the switch to actuate freely.

Some of our sealing boot offerings include:

- **Circuit breaker boots.** Our circuit breaker boots are available in back-of-panel or front-of-panel mounting styles. On both models, a continuous sealing rib wraps around the lower portion of the flange to provide a long-lasting seal. These boots are suitable for protecting electronic components from short circuiting and extending their service lives.



- **Toggle boots.** Our toggle boots consist of molded silicone placed over threaded mounting nuts. This design allows us to produce fully enclosed, single-piece components that cover the switch. Available in full and half styles, APM Hexseal's toggle boots include a sealing rib that keeps components securely attached to their mounting panels. These boots frequently find application protecting all types of toggle switches on fishing equipment and boat control panels.



- **Pushbutton boots.** Initially developed for military purposes, pushbutton boots are designed to provide push button switches protection against extreme environments, such as low or high temperatures, inclement weather, salt, dust, dirt, humidity, etc. Our pushbutton boots meet MIL-DTL-5423 specifications. When used, these devices seal electronic switches and safeguard them from potentially harmful external elements that contribute to corrosion and other damages.



## Applications for Sealing Boots

Across industry, sensitive electronic equipment requires protection against a variety of environmental factors to ensure continued operation and consistent performance. Within the marine industry, our sealing boots find use in a broad range of applications, such as:

**Military.** For more than 70 years, APM Hexseal has provided military-grade sealing solutions. During World War II, we designed and manufactured sealing fasteners to keep electrical military equipment free of environmental contaminants—such as dirt, dust, water, grease and salt—that could compromise operations. Designed from durable silicone material, our sealing boots serve as a reliable and economical shield in the most hostile environments.



**Commercial and Recreational Boats.** Like military vessels, commercial and recreational boats rely on sensitive onboard equipment. These systems similarly require protection from environmental substances—such as moisture, salt, or dust—to prevent contamination and ensure their continued operation.



**Investigation and Exploration.** Various scientific organizations, research institutes, and government agencies employ deep-sea submergence vehicles (DSVs) for research operations far below sea level. DSVs can be manually or robotically guided, allowing for investigation of remote or hazardous locations. In these extreme conditions, sealing boots and other components protect sensitive electronics from critical damage due to exposure to salt, water, and other environmental threats.



**Weather and Marine.** Weather and marine buoys are sensitive measuring instruments that collect data on weather, current patterns, and other oceanic and atmospheric conditions in the area. This collected information is vital to a variety of scientific research efforts. Available in moored and drifting models, these devices require sealing boots to protect their electronic monitoring components and keep them operating.



## Seal Stuff in to Protect Delicate Ecosystems



In addition to sealing environmental substances out to protect sensitive internal electronics, our sealing solutions also seal hazardous compounds in to protect vulnerable ecosystems.

From deep-sea locations to inland waterways, the waters and surrounding lands used for marine activities are at risk of contamination from leaking marine and undersea vessels. Depending on the compounds or pollutants contained within, when these vessels leak, the impact on the local ecosystem can be catastrophic. For example, when contaminants—such as heavy metals and chemicals—enter a marine environment, they can poison the entire food chain and cause fish and other food matter from that area to become inedible. Today, more than one-third of the fishing areas in the United States are negatively affected by pollution.

The majority of pollutants found in waterways stem from naturally occurring and human-based coastal and inland activities. Two main types of land-based pollutants affect marine ecosystems:

- **Nonpoint source pollution** results from smaller, individualized cases of runoff. Runoff can stem from minor sources such as septic tanks and vehicles and major sources such as farms, livestock facilities, and harvesting areas. Although separately these sources may not produce considerable amounts of pollution, collectively, they can cause significant damage to the surrounding environment.
- **Point source pollution** results from a single source and incident, such as an oil spill or an industrial accident. Although these incidents occur less frequently, they typically have a widespread and catastrophic effect on an ecosystem.

## Taking Preventative Measures

As a whole, oil spills are one of the biggest contributors to water pollution. Although big oil spills do have significant and lasting effects on the environment, collectively, smaller oil spills—such as from refueling or bilge discharging operations—can have a greater environmental impact.

Taking preventative measures, such as installing sealing boots and other sealing solutions, helps reduce the impact of marine operations on delicate ecosystems. By sealing marine equipment, manufacturers and end users not only protect sensitive internal electronics, they also mitigate the risk of hazardous compounds leaking and spreading into the world's waters. Implementing regular and thorough inspections of equipment and systems could prevent a potentially hazardous leak or malfunction. Our sealing boots and fasteners are reusable, making them a smart economic choice for items requiring frequent access or maintenance.

## Sealing Solutions From APM Hexseal

At APM Hexseal, we design and manufacture a wide range of sealing solutions to suit the unique needs of our clients. Some of our product offerings include:

- Circuit breaker boots
- Seeloc® washers
- Seelbolts®, Seelnuts®, and Seelskrews®
- Toggle, pushbutton, and rocker boots

To learn more about our durable sealing solutions and how they can benefit your next project, [ask the experts at APM Hexseal](#) today.



## LEARN MORE

Since 1947, we've been the leader in developing and manufacturing sealing solutions that prolong the life of sensitive electronic and mechanical components and systems in hostile environments. We offer a wide variety of elastomeric covers and sealing hardware, including a complete line of reusable, self sealing fasteners and sealing washers.

From self sealing boots and fasteners in a wide array of elastomer options, to a full design and manufacturing team ready for custom engineered sealing solutions, we have what you need to maximize performance from every component. To learn more about our offerings and capabilities, contact us today and let us help you find the perfect sealing solution. Ask the Experts at APM Hexseal!

*EVER BETTER.*

CONTACT US

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