



# Foundation Findings

A Boater Education Series

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## Foundation Findings Report # 34: July 2001 **Pillow Talk: Go Soak Your Bilge**

It's a law of nature that oil and water don't mix but it's also a fact of life that oil and boating do - and usually they mix quite well. Hydrocarbons - oil, gasoline, diesel fuel, hydraulic fluids - all play important roles in boating today. But when any of those substances steps out of character, through a leak, a spill or an accident, and comes into contact with water, either inside or outside your boat, you've got a problem.

Because petroleum products are toxic to fish, plants and animals, the federal Water Pollution Control Act prohibits discharge of oil or oily waste into all navigable waters of the U.S. Rather than establishing a quantity threshold for what constitutes an illegal discharge, the law says the mere presence of a film or sheen of oil on the surface is a violation. Thus, if oil is present in a boat's bilge water and the bilge pump discharges any of it overboard, the owner or operator is in violation of federal law - and subject to penalties up to \$5,000.

### The Products

The fact that oil and water don't mix is, in a sense, good news when it comes to leaks and spills inside your boat. Even better news is that certain synthetic materials in the polypropylene family can pick up the oil and leave the water behind, enabling you to discharge clean bilge water.

These products, known as oil socks and absorbers, or bilge booms, have been on the market for a long time but in recent years we've noticed a number of new offerings that spilled over from industrial applications to the boating market. Thus, we thought it was high time to see how well they work.



*A host of products remove oil and fuel from water.*

We approached this test from the point of view of the boater who has the very problem we all dread, oil in the bilge. To solve it, you go to the marine supply store for a product that will separate the oil from your bilge water and allow you to legally dispose of each. So what are your choices?

There is quite an array of products on the market and some aren't available in retail stores. We found several that are sold direct to the consumer via the Internet or in boating magazine ads.

We decided at this time not to focus on bilge cleaners or pump switches that shut off the flow if oil is present in the bilge, but to test products that actually remove the oil from the water.

In all, we came up with a dozen different sock-style products for testing - there are other shapes and sizes out there. Some are composed of soft, fabric-like synthetic material held in a mesh bag or other permeable enclosure that will float on fresh and saltwater but not retain it. Others contain proprietary materials that either capture the oil and retain it or break it down with the help of microbes implanted within the material. In addition we tested several varieties of flat sheets of the same basic material.

### The Testing

The products we selected fit into three categories: Collectors, Encapsulators and Bio Bugs. The Collectors are products in which oil is absorbed as well as those in which the oil adheres or "adsorbs" to the material. The Encapsulators are those in which the oil bonds to a material within the product that then turns the oil into a semi-solid. The Bio Bugs, or "bioremediation" products, promise to digest the oil.

We conducted two test series in simulated conditions using a simple protocol. It consisted of 12 numbered plastic trays of uniform size intended to replicate a boat's bilge. We assigned each product to a tray into which we poured two gallons of fresh water from a nearby creek.



**12 Pillows in "bilge water" are timed to soak up oil.**

**Two-Hour Test** - In the first go-around we used fresh 10w-30 motor oil mixed 50-50 with used engine oil and dumped 1 pint into each tray. The objective was to see how each product would handle a "Whoops! I-kicked-over-the-can" type of spill within a given time.

The research team monitored the trays at five-minute intervals for two hours, "sloshing" the brew every five minutes to simulate a passing boat's wake, and turning each product over at prescribed times. Team members recorded performance observations at each interval and estimated the percentage of oil removed.

None of these products indicates how quickly it works. We found it interesting, however, that at 10 minutes, one from each category was picking up the oil noticeably faster than the others, a reassuring trait if you've got an emergency spill. Two products with the smallest capacity (16-20 oz.) and one with a 3-quart capacity failed to handle at least 90% of the oil by the end of the two hours.

- **Capacity Test** - The products claimed capacities ranging from a half-pint to 1.5 gallon (see Product Chart) but since four made no capacity claim or were so very similar to another, we tested only nine to full capacity. To test them, we added the requisite amount of oil to each tray and checked them periodically. By the time we were confident all had reached capacity, the test had extended over 10 days.
- The Bio Bugs, however, can take months to complete the bioremediation process to consume the oil. Therefore, we decided to continue monitoring these products and report findings later (visit the Foundation Web page on [www.BoatUS.com](http://www.BoatUS.com)).
- **Drip Test** - In addition to the sock-type products, we also tested flat pads designed to be placed in a dry bilge under the engine or other mechanical component that might drip oil. Some pads are brand name and some generic. They are commonly sold in 18-inch squares. All appear to be made from the same material found in most products, the main difference being thickness.

We positioned each pad on a slight incline under a drip applicator that dispensed motor oil, a drop at a time, equivalent to one tablespoon per hour. The goal was to see whether the resulting spot would saturate and allow oil to seep through or if the oil would disperse throughout the pad.

As we expected, the thinnest pads, about 3/16-inch thick, saturated in the "drop zone" fairly quickly (three minutes for one). In contrast, the thicker products sold as "engine pads" with grommets in the corners to tie them in position lasted at least an hour and a half. While the engine pads are about 10 times more expensive than the thin single sheets, with this experience our test team started believing they would be worth using in bigger boat applications. And no, oil does not disperse through these pads but tends to stay under the drip.

## Oil Removal Product Comparisons

	Manufacturer	Product	Description	Size	Price	Claim-Capacity	10-min. test .5 qt oil	2-hr. test .5 qt oil	10-day test to capacity
The Collectors	Blue Ribbon Environmental	Polypro Bilge Boom	Plastic mesh outside with loop handle. Packed with "adsorbent" material remnants	13" x 3.75" dia.	\$11.00	no claim	slow	pass	no claim
	Eagle Marine	Oil Absorbing Bilge Boom	Plastic mesh outside with loop handle. 155" polypro sheet rolled up inside	14" x 4.25" dia.	\$10.99	4 qts	slow	pass	fail
	Seafit	Bilge Oilsorber	Plastic mesh outside with loop handle. 56" polypro sheet rolled up inside	16" x 3.75" dia.	\$9.99	2 qts	slow	pass	fail
	Seafit	Oilorb	Nylon mesh with a fabric sock inside, packed with loose fibers. Snap shackle on end.	20" x 6.5" dia.	\$19.99	6 qts	very fast	pass	pass
	Starbrite	New Maxi-Boom Bilge Oil-Absorber	Plastic mesh outside with loop handle. 56" polypro sheet rolled up inside.	16" x 3.75" dia.	\$6.99	2 qts	slow	pass	fail
	3M	Bilge Pillow	Thin fabric shell. Loose fibers inside.	7" x 15" x 1.5"	\$9.99	2 qts	fast	pass	pass
The Encapsulators	Abtech Industries	Oars Bilge Skimmer	Plastic mesh. Two tubes of porous material inside.	10" x 4" x 2"	\$10.00	1 qt	fast	pass	pass
	Advanced Aquatic Products	Bilge Bud e	White stretchy sock sewn shut over flexible insides. 5' tie cord attached.	3.5" x 7" x 1"	\$19.95-23.95 for a 2 pack	.5 qt	medium	fail	pass
	Blue Ribbon Environmental	Prozorb Bilge Boom	White stretchy sock outside with loop handle. Flexible inside.	14" x 4" dia.	\$9.96	3 qts	medium	fail	fail
The Bio Bugs	Lakefront Enterprises	Bilge Sock Captains Choice	White fabric shell with loop handle. Soft pliable pellets inside.	20" x 3" dia.	\$11.99	4 qts	very fast	pass	pass
	Eagle Marine	Bio-Remediating Bilge Boom	Plastic mesh outside with loop handle. 130" long polypro sheet rolled up inside.	14" x 4.5" dia.	\$11.99	4 qts	very fast	pass	pass
	Petrol Rem	Biosok Bilge Cleaner	Fabric outside, with retrieval cord on one end. Soft sandy feel inside.	9" x 3" dia.	\$24.99	.5 qt	slow	fail	pass

### Summary

In general, all the products we tested do the job they are made for, some faster than others and several a tad more completely than the rest. So, if you need to clean up a spill in your bilge, use one of the products that did well in the 10-minute test. If you are looking for long-term protection but don't have noticeable leaks, consider one of the Encapsulators or Bio Bugs because of the positive disposal option. Either way, definitely use pads where you have a drip to avoid oil collecting in your bilge.

No floating sock-type product removed every trace of oil, in part because of the bathtub-ring effect. But in every case, we picked up the sheen or slight liquid oil residue left behind after both tests by simply floating pads on the surface. Then we used the pad to wipe the tub ring off the sides of the trays. We would (and do) keep a supply of these inexpensive, generic polypropylene pads on any boat, inboard or outboard, to catch the odd drip or to use while refueling.

Many of the Collectors claim to be reusable. Just squeeze them out over a used oil receptacle and throw them back in the bilge, they say. Frankly, that may work well in some applications but we could see a bigger mess trying to extract the oil and even more latex gloves going to the landfill by trying to reuse these products.

Note that each category of product handles the oil differently once it's off your boat. The Collectors, unless you try to reuse them, remove the immediate problem but may merely transfer the oil to a landfill so consider disposal options in your area.

The Encapsulators, however, bind the oil within so that it should not leach out later. In fact, some Encapsulators are marketed to be recycled (again, check local disposal options). Bio Bugs seem to present the most environmentally responsible option because they are designed to contain the oil, then consume it over time. We couldn't test that but if it works, this long-term process offers the most promising solution.