

Practical Sailor™



Testing Sunglasses

PAGE 6

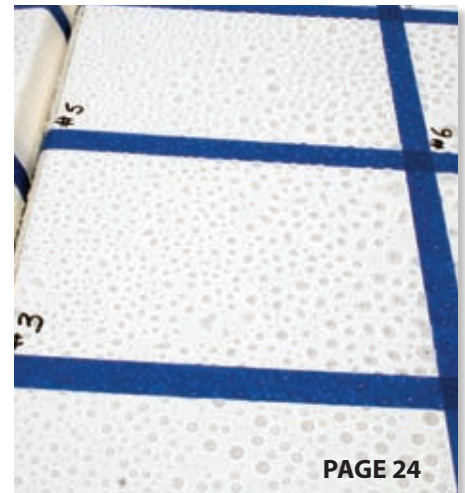
PS takes a close look at polarized peeper protectors.



PAGE 12



PAGE 20



PAGE 24

6 Sunnies for Navigation
Forget fashion and ad hype, PS focuses on glasses that work.

12 Feature-packed VHF's
High-end handhelds test looks at the bells-n-whistles.

17 Internal Tanks Sensors
PS flushes out the short-timers in the test after nine months.

20 Battling Bacteria in Fuel
Testers seek out best cure for dirty diesel and tainted tanks.

24 Liquid Hull Shiners
Our initial report on bottled waxes' gloss and beading.

29 Books for Her Shelf
A round-up of reads geared toward the women aboard.

ALSO IN THIS ISSUE

- 2 Rhumb Lines** — Mooring field madness in Florida
- 3 Mailport** — LEDs, PS online, VHF mics, and freshwater flushers
- 4 Where Credit Is Due** — Suncor Stainless comes through
- 32 PS Advisor** — Is synthetic oil in diesels worth the added cost?



The Crime of Owning a Small Boat

From shore, you can see the bright-green violation notice stuck to the hull of the San Juan 21. Several other boats in the soon-to-be “public” mooring field in *Practical Sailor’s* home port of Sarasota, Fla., bear similar stickers.

The letter that the city mailed to the owner of the San Juan spells out the terms: Move the boat by Aug. 1, or it will be impounded and possibly destroyed.

It’s a familiar story. Burdened by a variety of “boat problems”—some real, some imagined—city officials move to further regulate the local harbor. Responsible boaters who’ve historically used the anchorage for free plead their case, but they are no match for the landlubber majority.

A common solution is the one Sarasota has chosen: Install a fee-based mooring field and force boaters to use it. Many such mooring fields

Sailboat owners in Sarasota, Fla., are being asked to leave the city’s anchorage to make way for paid moorings.

around the country are fairly priced, often administered by a government agency. In Sarasota’s case, the mooring enterprise is supposed to be run as a not-for-profit enterprise. The contractor, Jack Graham Inc., also has a controversial long-term lease to run the adjacent marina, Marina Jack. The proposed mooring rates are above the norm, making it hard to dismiss the accusation that the fees are inflated to “keep the riff-raff out.”

Some riff-raff. The owners of the San Juan are a middle-aged couple. He’s a professional yacht skipper, originally from Australia. She’s a former charterboat-crew who holds a U.S. Coast Guard captain’s license. The boat lets them spend time on the water with their two children, a 5-year-old boy and a 4-year-old girl.

The family lives in a small house adorned with buoys and liferings less than a mile from the anchorage. Money is tight. The San Juan 21 that they revived a few years back is one of their few luxuries. It gets used, not as much as they like, but enough to justify keeping it ... until now.

The city’s plan to introduce “first-rate services” and first-rate fees doesn’t allow boat owners on tight budgets much choice. Pay up, or move along.

If you’ve ever heard an Aussie rant about over-regulation, then you can imagine the skipper’s reaction

when asked about the sticker on the family sloop. Keeping the San Juan on a trailer is an option, but when you’re the parent of young children, a trailer is one more obstacle to time on the water.

Setting a new mooring elsewhere presents legal hurdles, and the legality of re-anchoring outside the mooring field is murky. Last month, Florida reinforced its law preventing local governments from regulating the anchoring of non-liveaboard boats outside established mooring fields. (A liveaboard vessel is defined as one that is used solely as a residence and not for navigation.) This renders illegal the anchoring time limits that some cities (Sarasota included) have imposed. The new law, however, allows for communities to participate in state-approved “pilot” programs that could again bring strict anchoring rules.

To some degree, the fate of the San Juan still depends on how the anchoring rules are enforced locally. If the family can’t find an affordable, safe alternative, they are talking about storing the boat ashore, where the little San Juan will wait ... for a bit of sanity to return to this world.

Cover photo: Harken sunglasses undergo optical testing at Pacific University College of Optometry. (Biobor photo credit: Mahina Expeditions.)

Practical Sailor

July 2009 • Vol. 35 No 7

EDITOR

DARRELL NICHOLSON

CREATIVE DIRECTOR

JUDI CROUSE

ASSOCIATE EDITOR

ANN KEY

TECHNICAL EDITOR

RALPH J. NARANJO

EDITORS AT LARGE

DAN DICKSON, NICK NICHOLSON,
DOUG LOGAN, DAN SPURR

CONTRIBUTING EDITORS

SKIP ALLAN, KEN DELAVIGNE, DAVID GILL,
AL HERUM, ERIK KLOCKARS, FRANK LANIER,
JEREMY MCGEARY, JOE MINICK, MIKE SLINN

PUBLISHER

TIMOTHY H. COLE

EDITORIAL OFFICES

7820 Holiday Drive South, Suite 315

Sarasota, FL 34231

practicalsailor@belvoirpubs.com

CUSTOMER SERVICE, WEB, BACK ISSUES, OR FAX SERVICE

PO Box 5656

Norwalk, CT 06856-5656

800/424-7887

customer_service@belvoir.com

SUBSCRIPTION DEPARTMENT:

800/829-9087

www.practical-sailor.com/cs

Box 420235

Palm Coast, FL 32142-0235

for Canada:

Box 7820 STN Main, London, Ontario
N5Y 5W1

B

Belvoir

Practical Sailor (ISSN #0161-8059) is published monthly by Belvoir Publications Inc., 800 Connecticut Ave, Norwalk, CT 06854-1631. Robert Englander, Chairman and CEO; Timothy H. Cole, Executive Vice President, Editorial Director; Philip L. Penny, Chief Operating Officer; Greg King, Executive Vice President, Marketing Director; Marvin Cweibel, Senior Vice President, Marketing Operations; Ron Goldberg, Chief Financial Officer; Tom Canfield, Vice President, Circulation. Periodicals Postage paid at Norwalk, CT, and at additional mailing offices.

Copyright © 2009, Belvoir Publications, Inc. All rights reserved. Reproduction in whole or in part is strictly prohibited. Printed in USA. Revenue Canada GST Account #128044658. Canada Publishing Agreement Number #40016479.

Subscriptions: \$84 annually. Single copies, \$7.50 (U.S.). Bulk rate subscriptions for organizations and educational institutions are available upon request.

Postmaster: send address corrections to Practical Sailor, PO Box 420235, Palm Coast FL 32142. Practical Sailor, P.O. Box 39, Norwich ON, NOJ 1P0 Canada. WDS return address in Canada: Station A, P.O. Box 54, Windsor, Ontario N9A 6J5.

REPRINTS FOR PUBLICATION AND WEB POSTING AVAILABLE

Contact Jennifer Jimolka, Belvoir Media, 203/857-3144

PRACTICAL SAILOR ACCEPTS NO COMMERCIAL ADVERTISING

MAILPORT



Photo courtesy of John Lowe

ONLINE ARCHIVES

I am a subscriber to *Practical Sailor*, but when I go to your website and ask the system for the article done five or six years ago, it wants to sell it to me.

Am I reading the data wrong; am I not to get access as part of my subscription?

John S. Lowe
Hinckley Pilot 35
Dallas, Texas

We're trying our best to provide subscribers with the most value for their money, but for now, we must continue our policy of charging everyone to download articles published more than two months prior. Subscribers get a discounted rate on these archive articles, available at www.practical-sailor.com, and all subscribers have full access to this month's issue and the previous month's issue, as well as to other subscriber-only online content. Readers who register online get e-mail notifications, along with issue highlights, when each new issue is posted online. We encourage readers to download and save the articles (features are now available in PDF format) as soon as they become available. We recognize the value of having access to archive tests and are working to expand subscriber access.

To search by keyword, use the "SEARCH" button on the homepage. If you know the date of publication, the "Back Issues" button will work. An annual index of articles is published every December, and this month, there's an abbreviated index on page 31. For help logging on or finding a back article online, contact customer service (800/424-7887 or customer_service@belvoir.com).



John Lowe's newly purchased Hinckley Pilot 35 chomps at the bit in Maine, waiting for its new owner to turn it loose from its storage shed.

GLASSES TREATMENT

Regarding a reader's request for advice on keeping sunglasses clean (Mailport, April 2009), I've had good luck using Rain-X (www.rainx.com). It doesn't eliminate the salt buildup, but the spots are more uniform and easier to see through. I use it on cheap drugstore glasses, the kind I don't mind stepping on or losing.

Kim Hamilton
McGregor Venture 17
Los Gatos, Calif.

Many of the sunglasses reviewed this month touted hydrophobic coatings, but testers did not notice much difference when the saltwater really started flying. Rain-X is meant for windshields, and most sunglass makers do not recommend it on glasses, particularly those with plastic lenses. But we won't argue with what works!

LED CABIN LIGHTS

I read with great interest your February 2009 article "LED Light Bulb Shootout." I am about to buy several-hundred dollars worth of LED lamps, so I studied the article thoroughly. The narrative speaks well of the Dr.LED 3-watt lamp, and then without further discussion dismisses it because it "protruded from the fixture

and drew more amps." Does it matter if it protruded?

Jack Wilkinson
s/v *Pashka*, Island Packet 38
League City, Texas

The Dr.LED 3-watt element reviewed in the article was bright, but not suitable for the bulkhead reading lamp fixture used in the test. Because it sticks out from the lamp bell, it does not get the full benefit of the reflector. Furthermore, it is simply too heavy to seat securely in the tiny G-16 sockets. The light is available in other socket types (an Edison screw bulb

PRACTICAL SAILOR ONLINE

Our reader survey on favorite do-it-yourself boat yards will remain online at www.practical-sailor.com for another 30 days. Be sure to rate the best yard in your area. You don't have to be a subscriber to participate. A link to the survey is posted at the top of the homepage, and we hope that readers will share their views on this topic. Readers are also encouraged to check out some classic tests, DIY tips, and special reports resurrected from the archives in our "Tools and Techniques" section.



Midnight Rider's do-it-yourself freshwater flusher cuts down on head odors.

among them), and we presume these would stay put better. Look for our LED navigation light test in an upcoming issue.

CHECK OUT THE S.2

I have another suggestion for reader Al Otman of Minnesota, who wanted an easily rigged trailerable 20- to 26-foot boat, with a preference for one that is fast. I would recommend either the 22-foot S2 6.9 or the 26-foot S2 7.9. Both have lifting, daggerboard-style keels, with the benefits that they are easy to launch, and sit low on the trailer (much easier to board the boat while it's on the trailer). The keel has a high-aspect ratio that makes the boat very close winded, and much, much faster than any of the other recommendations. They are well constructed. Two able people can step the mast on my 6.9, or if a tabernacle

were rigged, one person could do it.

Since it was made in the midwest, I'll bet there are some out there.

Mark Helder
Sebago Lake, Maine

Thanks for the suggestion. The list of reader suggestions, along with those for strongly built, "tough" cruising boats, will be posted online in the near future.

A PROPER FRESH FLUSH

Regarding the \$300 Fresh Flush freshwater flushing system (www.freshflush.net) recently featured in the April issue, I took care of the smell problem associated with heads a long time ago and for a lot less money. At first, I used a flush bottle filled with treated water and poured it into the toilet every time we used it. Then I got

tired of filling the jug and decided to install a flush tank. Pretty easy really, just mount a tank—ours is 3 gallons—in close proximity to the head, connect the hoses and bingo, fresh water for flushing.

In the picture (at left), you will see the tank mounted just aft and to port of the shaft log on our Hunter 30. The tank inlet is connected to a fill tube, the outlet goes to the head, and a fill tube and through-hull filler mounted in the sole under the aft cabin.

We have no head smells, and I do not have to fill it so many times. Just lazy, I guess.

Doug Neureuther
Midnight Rider, Hunter 30

Both your system and the Fresh Flush are good designs in that the head fill tank is independent of the potable drinking water supply.

WATER TUNES?

I recall seeing in a past issue a hard, clear plastic case for an MP3 player. It may have also included speakers. I thought it was waterproof, but we don't intend to get water in the cabin anyway. It would be ideal to have a unit that would include everything I needed to run my Sony Walkman MP3 player.

Walt Wyatt
Precision 23
Michigan City, Ind.

The search for an affordable portable marine-ready player continues. The tiny-sounding \$30 iFloat featured in the November 2006 appears to be extinct. In August 2007, we tested the Ego from Atlantic Inc. (www.atlanticego.com), which has a line of portable waterproof systems starting at \$70. We are currently testing a small \$50 multi-charge (solar, crank, DC) speaker-weather radio-AM/FM system, the Activetrax On the Go Deluxe from Seattle Sports (www.seattlesportsco.com). The \$120 i-XPS 120 Outdoor, a rugged, splash-resistant player from Hercules (www.hercules.com) looks promising, but we have not tested it. Suggestions?

WHERE CREDIT IS DUE

SUNCOR STAINLESS

We had a problem with our do-it-yourself lifelines from Suncor Stainless (www.suncormarine.com). We notified Ed Mayo of Suncor in Massachusetts last fall and he offered to come to our boat, which was in Noank, Conn., at the time, to remedy the problem. Weather and winter intervened but he came through for us with flying colors, actually replacing all the DIY fittings (which had a rusting problem which Suncor has

since rectified) with the newest version. They even replaced the pelican hooks (which I had clumsily dropped overboard while checking out the rusting situation) with no extra charge. This company goes out of its way to insure customer satisfaction and should be commended.

John Fyfe
Rights of Man,
42-foot Geiger-Whitholtz ketch
Avondale, R.I.

ACTIVE RADAR

I am installing a Raymarine Automatic Identification System (AIS) on my 35-foot Wauquiez Pretorien sailboat, but I also want to install an “active” radar target enhancer (RTE). A British product called “Sea-Me” is the most prominent player on the market. Another product, the “Activ’Echo,” a French RTE, seems to be common among the Open 60 and Open 40 classes, but they appear to be no longer in production. There does not seem to be a great deal of information on these units, although the general opinion seems to regard RTEs as substantially better than a passive radar reflector of any design. Do you have any advice on these products?

R.D. Buchanan
Fianna, Wauquiez Pretorian

We are in the process of putting together tests for a variety of AIS devices as well as these radar target enhancers. Both are relatively new devices in the cruising market. Certainly anything that enhances your visibility to other ships at sea is helpful to avoid collision. We are concerned about how some of these devices are being marketed, however. They are NOT a substitute for conventional radar, and this should never be implied in any marketing literature. AIS receivers can receive key navigation data, including course and speed, from ships equipped with AIS transceivers. (International rules require large ships to carry this equipment, but most smaller vessels, including fishing boats, are exempt.) More expensive Class A and Class B AIS transceivers can both send and receive AIS signals, so the operator can, in effect, see and be seen by ships in the area. ETRs enhance a boat's radar target to ships operating ra-

dar. However, both these systems place more reliance upon the technology and watchstanding capabilities of other ships to avoid collision. Radar, by comparison, enhances the sailor's own watchstanding ability independent of what electronic devices other ships have on board or who is operating them. In addition, radar is an excellent navigation and weather tracking tool. We were very disturbed to see a testimonial letter on the Sea-Me website, www.sea-me.com, describing a sailor who happily removed his radar system and installed an AIS unit and the Sea-Me target enhancer, implying that this was the safer choice.

Practical Sailor welcomes letters from our readers. Please include your name, home port, boat type, and boat name. Send e-mail to practicalsailor@belvoirpubs.com and mail to *Practical Sailor*, 7820 Holiday Dr. S., Suite 315, Sarasota, FL 34231.

PRODUCT NEWS**Garmin, Kidde Issue Recalls; New Windlass Service Launches**

Garmin is voluntarily recalling its 2009 version of BlueChart g2 and g2 Vision data cards. The affected data cards were sold between April 8 and June 3.

In certain waters, the data card provides inaccurate indications of the depth of the water. Specific reports of errors were noted in charts of the waters along the coasts of Sweden and Denmark, but out of caution, Garmin is calling for a global recall.

Boaters should not use BlueChart g2 or g2 Vision 2009 data cards dated March 2009 for navigation. Anyone who owns BlueChart g2 or g2 Vision v2009 will be given a replacement traditional BlueChart card or g2 Vision card v2008.5 (dated July 2008) free of charge and will also receive the 2009 card free of charge when it is re-released. Affected customers may contact their retailer or Garmin directly at 800/800-1020, via e-mail at cartography@garmin.com, or online at www.garmin.com/bluechartrecall.

FIRE EXTINGUISHER RECALL

Walter Kidde Portable Equipment, manufacturer of portable fire extinguishers, is recalling approximately 167,000 of its products made in Mexico. The recall involves the Kidde XL fire extinguishers, model numbers FX340SC, FX340H, FX340GW, XL5MR, FX210R, FX-

340SC-2, FX210W, XL2.5TCZ-4, E-340-3, with manufacture dates between October 2007 and April 2008.

If your extinguisher is one of these, you should immediately inspect the pressure gauge. If it points to the red zone, contact Kidde to receive a free replacement extinguisher. If the gauge is not in the red zone, but you have questions about an extinguisher within the listed model numbers, contact the company. Kidde representatives can be reached at 888/345-4407 or online at www.Kidde.com.

**SEATIGER WINDLASS SERVICE**

A former employee of Simpson Lawrence has set up manufacture of the complete Seatiger windlass and is now able to supply parts, as well as complete windlasses.

Although the company is based in the UK, it is able to supply customers all over the world via its website, www.slsparcs.co.uk. In production for many years, the manual Seatiger is a common sight on foredecks of U.S.-built boats.



Hijacked by High Fashion?

PS looks through the hype and puts test focus on eyeball navigation.

With all the marketing nonsense surrounding sunglasses, it's easy to forget that a good pair of polarized lenses is a tool, as essential to sailors as a good knife.

The principal purpose of sunglasses is to prevent ultraviolet rays, implicated in eye diseases ranging from cancer to cataracts, from reaching our eyes. Both UVA (400-320 nanometers) and UVB (320-290 nanometers) are harmful, but UVB is considered the most damaging. The American National Standards Institute (ANSI) requires non-prescriptive sunglasses to meet a series of standards under ANSI Standard Z80.3. Unfortunately, the UV transmission limits are fairly loose for non-prescriptive eyewear, enforcement is poor, and worthless counterfeits abound. The best way to ensure you're getting the protection you need is to choose lenses that block *at least* 99-percent UVB and 95-percent UVA and to buy from a reputable dealer.

The unisex Oakley wrap-around Hijinx scored well with our women testers. The bronze HCL lens ranked high among the polycarbonate lenses, particularly for eliminating prismatic effect.

PS last looked at sunglasses in the Aug. 15, 2001 issue. Since then, new lens materials and manufacturing methods have emerged, and, of course, styles have changed. Prices have gone up, but you can still find quality non-prescription polarized sunglasses that offer the protection you need for less than \$40.

WHAT WE TESTED

For the purposes of this test, PS concentrated on another key function of sunglasses for sailors: reducing reflections on the water's surface so the wearer can better judge the bottom depth by sight. This pared the field down to sunglasses with glare-cutting polarized lenses. Keenly aware that a comprehensive test was impractical, we assembled 25 different polarized glasses representing a cross-section of what's available in the high, mid-range, and low-price categories.

The list included some of the big names in the industry like Oakley and Maui Jim, as well as companies that market eyewear specifically to sailors like Hobie, Kaenon, Gill, and Harken. We also included some popular fishing glasses and some inexpensive frames, including a pair of \$14 glasses picked up at a gas station and \$8 children's shades from a mega-retailer.

The main goal of the project was to set some firm criteria for selecting sunglasses for eyeball navigation and to resolve that nagging question: Do we really need to spend \$200 to obtain good quality lenses. (Spoiler alert: The answer is no.)

HOW WE TESTED

Testing began in the field as six volunteers with good uncorrected vision and different face types subjectively compared the glasses in various on-the-water tests. To judge each lens' usefulness for eyeball navigation, testers observed a variety of bottom features (grass, sand, rock) in depths from 3 to 40 feet. Testing took place under partly sunny and overcast conditions at midday.

The "distant shoal" test, which required spotting a sandy shoal at three-quarters of a mile under cloudy skies, proved to be a good benchmark. A few glasses made it easy to distinguish the shoal, but with most it was invisible.

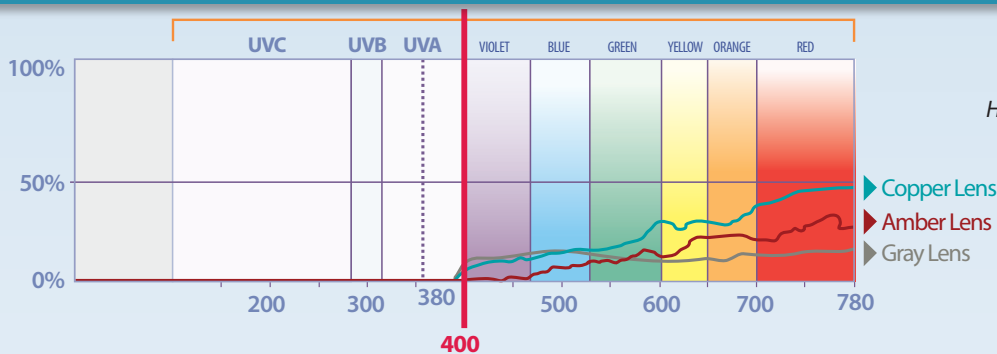
Testers also independently evaluated the glasses for fit, peripheral vision, comfort, magnetism, smudge resistance, corrosion resistance, and the ability to prevent fogging and shed water. The glasses were also compared when viewing a handheld GPS and a chart. Anti-reflective coatings, which help ghost images reflected on the inside of the lenses, also were checked. Style was not evaluated.

Glasses that excelled in the field tests and three pairs that fell short were sent to Dr. Karl Citek at Pacific University College of Optometry in Forest Grove, Ore. for analysis. (Full disclosure: Dr. Citek is co-inventor of patents licensed by Nike, but receives no compensation, royalties, etc.) The "Lens" scores in the Value Guide on page 8 show results in the field and the lab. The following are some of the optical tests carried out:

- **Lens warpage:** This meridional lens "flex" is often caused when oversized lenses are squeezed into their frames. This helps lenses stay in their frames, but the distortion can lead to tired eyes.

- **Prismatic effect:** Imperfect, curved lenses tend to bend the light when you are not looking directly through the center of the lens. Polycarbonate lenses are particularly prone to this. Unless you want to hit a Tim Wakefield knuckle ball, you can probably live with it.

BUYER'S GUIDE



Copper (brown) lenses heighten contrast and let more red light pass (above). The Gill and Oakley amber lenses (right) allowed the most light in our test.



Look for UV protection, good fit, impact resistance

The ideal pair of sunglasses will vary among individuals. Fair-eyed people, for example, often prefer darker lenses. Our list of must-haves include UV protection, polarization, impact-resistant lenses, and good fit.

UV PROTECTION: All sunglasses should block a *minimum* of 99 percent of UVB and 95 percent of UVA radiation. *PS* recommends 100-percent protection.

FIT: Glasses should be secure on your face and allow perfect peripheral vision.

- Look for wraps/shields or frames with large eye coverage for maximum protection from sun and wind.

LENS MATERIAL: The best lens material often depends on how the glasses are to be used (or abused).

- Polycarbonate lenses: very high impact resistance, can be thin and light, good optics.
- CR-39: good optics, comfortable and

lightweight, common for prescription.

- Glass: Clear, crisp vision but can be heavy, very scratch-resistant.
- Propionate/acetate: thin and light lenses, not for prescription.
- NXT: polyurethane, very impact resistant, good optics.
- Trivex: impact resistant, good optics, not available in polarized.
- SR-91: impact resistant, good optics.

LENS TREATMENTS/ TINTS: Tints and treatments help define the lens' purpose. A glare-reducing polarizing filter is a must.

- Photochromic: Good UV protection, adjusts tint to varied light conditions.
- Scratch-resistant/hydrophobic: minimizes abrasions (front and back) and can help repel water.
- Mirror flash treatment: Reflects light, conceals eyes.
- Copper or brown tint: Helps improve contrast and bottom definition.

- Rose or amber tint: Lenses that block only 70 percent of visible light are good general-purpose lenses for early morning/late afternoon/early evening.
- Grey tint: Good general purpose tint that is good for mid-day use and maintains natural colors.

CARE AND CLEANING: A hardcover case is key to protecting your investment. A soft microfiber bag is convenient way to protect lenses.

- Never use papertowels, tissue products, or your clothes to clean your eyewear. To avoid scratching your lenses, use a specialized eyewear cleaning cloth that is soft and lint free.
- Don't leave your glasses in the sun or on the dashboard of your car. Excessive heat and cold can cause them to warp over time.

Sources: Vision Council (www.thevisioncouncil.org), Dr. Karl Citek at Pacific University College of Optometry.

- **Resolution:** A standard test using closely spaced vertical and horizontal lines is used to evaluate the "sharpness" of objects when viewed through a lens.

- **Luminosity transmission:** Testers used a spectrophotometer to measure the total amount of visible light as well as the amount of light in the various wavelengths (including UVA and UVB) transmitted through each lens.

- **Tint:** This is the dominant tint of the lens, not to be confused with the colored mirror flash coating applied to the outside of the lens. The latter reduces light transmission and conceals your eyes but generally does not change the tint.

WHAT WE FOUND

On the water, sunglasses with brown tints (the brochures call it "copper") performed better than those with basic grey lenses. Amber lenses scored well in the low-light testing.

The overall favorites were brown- or amber-tinted lenses that allowed between 8-percent and 14-percent light transmission and showed exceptional resolution. This included lenses from Costa Del Mar, Oakley, Maui Jim, Harken, and Kaenon.

Claimed specs for total light transmission were often markedly lower than those found in the lab. For example, the Kaenon specifies a 12-percent light

transmission for its C-12 lens, yet the lab tests showed about 8.5 percent.

Although brown lenses scored highest in the eyeball navigation exercises, grey lenses often are preferred for everyday use because of their ability to accurately show "true" colors. A few makers did not submit brown lenses; we suspect they would have scored higher in our comparison had they done so.

With regard to frames, testers favored wraparound designs that prevented light from entering at the sides and bottom. Snug frames and a good hat are essential to reducing UV exposure. Soft

Continued on page 9

PERSONAL PICK



Bollé Spinner



Costa Del Mar Blackfin 580



Gill Gemini

AS VALUE GUIDE SUNGLASSES FOR EYEBALL NAVIGATION

MAKER	MODEL	LENS/ LENS TINT	LENS MATERIAL*	FRAME MATERIAL	WEIGHT	FRAME	LUMINOUS TRANSMITTANCE	LENS FIELD/LAB	PRICE ‡	WARRANTY
BOLLÉ	Spinner 11060	Offshore Blue/Grey	PC	Nylon	1 oz.	Very good	5.5%	Fair/Fair	\$135	1 year
COSTA DEL MAR ★	Blackfin 580 GLS	580 Copper	Glass	Nylon	1.7 oz.	Good	10%	Excellent/Good	\$229	Lifetime
GILL	Gemini 9635B	Brown 22/Amber	Acrylic	Nylon	.6 oz.	Good	12%	Good/Fair	\$70	Lifetime
HARKEN \$	Gale 2093	Brown	PC	Nylon	1.1 oz.	Very good	12%	Very good/Very good	\$90	2 years
HOBIE	Bayside 94GCPG	Copper with green mirror	Glass	Nylon	1.7 oz.	Excellent	7%	Good/Very good	\$210	Lifetime
KAENON ✓	Hard Kore	Copper 12/Brown	SR91	Nylon	1.5 oz.	Very good	8%	Very good/Very good	\$209	1 year
MAUI JIM ✓	Peahi mj202	HCL bronze/brown	Glass	Nylon	1.8 oz.	Good	9%	Very good/Very good	\$209	2 years
NIKE **	Haul EV0312 001	Grey Max Polarized/Grey	PC	plastic	1 oz.	Good	12% (Maker's spec)	Good	\$100	1 year
OAKLEY ✓	Hijinx 03-597-v001376	Bronze/Brown	PC	Nylon	1.2 oz.	Excellent	15%	Very good/Excellent	\$180	2 years
OCEAN WAVES **	Molokai	Grey with blue mirror	PC	Nylon	1.3 oz.	Very good	10% (Maker's spec)	Fair	\$159	Lifetime
POLAR OPTICS **	Solar3 Antic	Grey	PC	Aluminum	1.5 oz.	Fair	12% (Maker's spec)	Fair	\$35	Lifetime
UNDER ARMOUR **	Zone XL	Grey with blue mirror	PC	Nylon	.9 oz.	Very good	12% (Maker's spec)	Fair	\$140	Lifetime
TYPHOON	Gale Force 919TBR	Sunset brown	PC	Plastic	1 oz.	Good	9%	Fair/Fair	\$55	Limited lifetime
GAS STATION SPECIALS	MV1302	Grey	Acrylic	Plastic	.6 oz.	Fair	13%	Fair/Fair	\$13	Store

★ Best Choice \$ Budget Buy ✓ Recommended

*PC=Polycarbonate **Field trials only ††Average retail price



Harken Gale



Hobie Bayside



Kaenon Hard Kore

PERSONAL GEAR



Maui Jim Peahi



Nike Haul



Polar Optics Solar3 Antic

Continued from page 7

rubber, “no-slip” bridge grips and ear pieces were popular, but they also pick up sunscreen stains and tend to become gummy during their lifetime. Ideally, any such rubber components would be easily replaceable. Not all glasses fit well with hats (Oakley-style temple grips wouldn’t stay put beneath our favorite Mount Gay Rum cap), something buyers should check.

What follows are capsule observations on the five favorite sunglasses for eyeball navigation as well as some short profiles of representative types. For more on what to look for in sunglasses, see the “Buyer’s Guide” on page 7.

GLASS LENSES

Three of the manufacturers sent us samples with glass lenses: Costa Del Mar, Hobie, and Maui Jim. Although the tested glass lenses met or exceed the accepted ANSI standards, opticians do not recommend glass for sports eyewear because they do not absorb impact well. Generally, glass-lens vendors tout the superior optical performance and scratch-resistance of glass and downplay the cons of added weight and the potential for breaking. The lab-tested glass lenses stood out for their excellent scores, but some of the non-glass lenses did as well or better overall. *PS* does not recommend glass lenses for racing or small boat sailing.

COSTA DEL MAR BLACKFIN 580 GLS

Costa Del Mar touts patented lenses that absorb the yellow light in the 580 nanometers wavelength, although several other basic brown-tinted lenses yielded similar spectrophotometry. The Costas

were unanimously praised for their ability to distinguish bottom features, particularly under overcast skies. One of the most notable effects of these glasses is that red colors “pop,” making it easy to pick up red markers on the water or chart.

The Costas and the Harkens were the only pairs with a perfect score in resolution testing (each had one perfect lens), although the Costas had more of astigmatism and horizontal prism distortion than any other on-the-water favorite. The Blackfin frames provided great UV protection, but only Fair peripheral vision.

Costa Del Mar told *PS* that it had discovered a batch of its 400 lenses that were more susceptible to delamination problems, but this had been corrected, and it was not aware of any similar problems in the 580 lenses.

Bottom line: These were the best glasses for eyeball navigation, and on that basis, they earn Best Choice. We’d opt for different frames with more peripheral vision.

HOBIE BAYSIDE/COPPER LENS

Testers looked at three lenses and frame types from Hobie. All rated Very Good to Excellent in the field, with the Bayside frames scoring highest. The Hobie’s lens coating sheds water better than most, but none of the tested glasses that touted hydrophobic coatings were immune to saltwater spray or smudges.

The Hobie copper with green-mirror lenses were ex-

cellent in bright sunlight. Their quality optics stood out in the lab, but the lenses blocked too much light to pick up bottom details well. This also posed a problem when viewing LCD screens. The Bayside frames—featuring spring hinges, very little light leakage, and Excellent peripheral view—were a favorite among male testers, but some women found them too big.

Bottom line: These offer good optical quality and an excellent frame. The dark lenses would serve well offshore, but for eyeball navigation, we would opt for Hobie’s copper lens with no mirror.

MAUI JIM PEAHI/HCL BRONZE LENS

All three Maui Jim samples had glass lenses and all rated highly on the water. The pick of the litter, the Peahi frame style with a bronze lens, scored equally well in the lab. Less than a .01 diopter change in the optical power was found in either lens, exceptional for sunglasses.

These were the heaviest glasses among our finalists. The spring-hinge frames offered only Fair peripheral view, but eye protection was excellent. They blocked a bit more light than the Costa Del Mars and ranked only slightly behind them on the water. Resolution scores were high, although some horizontal prismatic effect was noted in one lens.

Bottom line: The Maui Jim Peahis with HCL Bronze lenses had excellent optics and should serve as a durable tool for eyeball navigation. Downsides are the price, potential breakage of glass lenses, and weight.

PLASTIC LENSES

Plastic lenses greatly outnumbered glass lenses in the comparison. Samples were either acrylic, polycarbonate, C-39, or



Oakley Hijinx



Ocean Waves Molokai



Under Armour Zone XL



Typhoon Gale Force



Gas Station Specials
China - MV1302

PERSONAL GEAR



Wraparound styles like these preserve peripheral vision and block light leaks: (clockwise from top left) Harken Grinder, Kaenon Rhino, Hobie Luecadia, and Bollé Recoil.

SR-91. (See “Buyer’s Guide” on page 7 for more on these materials.) While the plastic lenses generally scored below glass on the water, several plastic lenses, including those from Kaenon, Oakley, and Harken, did as well or better than some glass lenses in some lab tests. The cheapest kid’s plastic lenses still blocked more than 99-percent UVA and UVA. Plastic lenses with flash mirror coatings generally did worse in overcast daylight and LCD screen tests.

OAKLEY HIJINX/COPPER LENS

Oakley lists its “high-definition” polycarbonate lenses as copper, but they were closer to amber, presenting the highest light transmission rating in the lab test (about 14 percent) among the finalists. They ranked consistently in the top four for eyeball navigation. The pair had very little distortion away from the center of the lens (prismatic effect), rare among polycarbonate lenses. The Hijinx frame provided excellent protection and was popular among female testers, but peripheral vision was a notch below the best.

Bottom line: Optically, these were the best polycarbonate lenses, showing none of the prismatic effect found in the Harkens, their nearest on-the-water competitor. Whether this is worth the extra \$100 depends on your budget and how you plan to use them.

HARKEN GALE/BROWN LENS

In the field and the lab, these amber polycarbonate lenses matched up with the more expensive Oakley, Maui Jim, Kaenon, and Costa Del Mar

glasses. The anti-reflective coating on the inside of the Harkens was better than that on similarly priced glasses. The wraparound nylon frames were unexciting but functional, seemingly not as strong at typical failure points (hinges, bridge, and ear pieces) as some pricier glasses, but rugged enough.

Bottom line: In the field and in the lab, the Harkens compared favorably to some of the most expensive glasses in our test. They are indisputably our Budget Buy in this category.

GILL GEMINI

Gill sent us its youth Firefly (blue lens), unisex Classic (smoke lens), and women’s Gemini glasses (copper lens), all with acrylic Polaroid lenses. Gill’s newest glasses have improved PTX4000 lenses, which were released after our test. All of the glasses stood out for their lightweight floating frames and comfortable fit. The Gemini glasses with copper lenses fared the best of the three in the eyeball navigation test. In the lab, the thin acrylic lenses in the Geminis allowed for very little prismatic distortion, but they had notable warpage.

Bottom line: Buoyancy could not lift these above others in their class.

KAENON HARD KORE/C-12 LENS

Kaenon is the only manufacturer that offers lenses made of SR-91, a proprietary plastic that is stronger and has better abrasion resistance than polycarbonate. On the water, these glasses with brown C-12 lenses provided a good balance between light transmission and tint, proving capable of defining shoalwater in sun

.....
Costa Del Mar’s warranty will cover lens delamination (top). Broken lenses are addressed case-by-case.

and shadow.

The C-12 lenses blocked slightly more light than the Costas and Maui Jims, and this was noticeable when looking at an LCD screen and navigating in overcast conditions. The left lens showed some minor prismatic effect. The frames were durable and offered excellent protection, but some testers noted that the Hard Kore’s broad ear pieces put more pressure on the ears than other premium glasses.

Bottom line: With rugged frames and very good optics, the Kaenons may be worth the price for those who are plagued by scratched lenses and don’t want glass.

TYPHOON GALE FORCE

We sent these \$60 shades from West Marine to the lab as a representative of mid-priced fishing glasses. The frames were very comfortable and provided good protection. Although the lenses blocked 100-percent UV and had similar spectral characteristics as the on-the-water favorites, they rated low in the field. The reason became clear in the lab, where the lenses showed significant warpage, prismatic effect, and mediocre resolution.

Bottom line: You can do much better in this price range.

BOLLÉ SPINNERS

Testers liked the comfortable wrap-around frame with side windows that preserved peripheral vision. On-the-water tests, however, found the darker lenses could not compete with others in shoalwater navigation. (Other lenses are available.) The lab yielded mediocre performance numbers.

Bottom line: With a high price and mediocre performance, the Spinners with “Offshore Blue” (grey) lenses fell short of expectations.

OTHERS

Several manufacturers sent a selection of sunglasses that didn’t rate high enough in the field to earn a trip to the



PERSONAL GEAR



Surfing culture was prominent in the marketing literature of several makers, including the all-recycled E.C.O. Rob Machado sunglasses (left) and the Sea Specs (right). Neither served particularly well for the purpose of eyeball navigation.

lab, but deserve mention here. Specifications and ratings for field tests for some of these glasses appear in the Value Guide on page 8. These manufacturers may offer lenses and styles that better fit our criteria, but the ones they submitted did not.

Dragon Alliance E.C.O.: These glasses “inspired” by surfing icon Rob Machado are touted as being made entirely of recycled material. The testers liked the eco-approach, but the retro-style frames leaked light and the polycarbonate lenses were too dark to do well in the field tests.

Ocean Waves: Prominent at many boat shows, this Florida sunglasses maker sent us several pairs, nearly all of which had grey lenses with flash mirror coatings. As mentioned, no lenses with these features rated very strongly in the field testing. Ocean Waves’ best performing entry was a brown lens with a green flash coating from their Jack Nicklaus line.

Sea Specs: These \$50 goggle-type glasses have a vocal following on the Internet as watersports glasses. While they were comfortable, testers found them too dark for eyeball navigation. The brown polarized Sunset Specs would presumably do better.

Nike Haul: These comfortable, lightweight glasses had an interesting frame design with interchangeable lenses. They were among the better grey lenses on the water.

Under-Armour Zone XL: These comfortable sports glasses offered excellent protection, but were held back by their dark grey tint and reflective coating.

Gas-station specials: These comfortable, lightweight glasses with acrylic lenses scored fair on the water, and they blocked 99.9-percent UVA and 99.8-percent UVB.

Polar Optic Solar 3 Antics: This aluminum frame model did not rate high, but a pair of fitover Polar Optics with brown lenses scored well on the water.

CONCLUSION

An investment in good sunglasses will pay off when your arrival at a narrow, unmarked pass coincides with grey, flat

light. Generally, the higher-priced sunglasses in this comparison brought better optics, more rugged frame construction, more size options, and stronger warranty policies. However, one of the highest-rated pairs was not nearly the most expensive, so it’s clear that price alone is not a good benchmark.

Based on our testing, we’d recommend cruising sailors have at least two sets of polarized sunglasses. A pair of high-quality, brown-tinted shoal spotters should stay on the boat, while a pair of all-purpose grey lenses can be reserved for everyday use. Aim for light transmission of 10 percent to 14 percent, but note that in our test, lenses tended to block more light than the specs stated.

Lens material selection will depend on how you use (abuse, or lose) your glasses, although we’d stay away from cheap acrylic lenses that easily pop out.

If your budget allows, or you have sensitive eyes, think about adding a pair of darker tinted glasses for offshore. But remember, glasses with less than 8-percent light transmission aren’t considered safe for driving. A pair of inexpensive high-transmission (14 to 18 percent) amber lenses can serve as boat backups or for low-light conditions. Frames need to be comfortable and secure and should minimize or eliminate light leaks. Otherwise, all that UV protection is for nothing.

In this comparison emphasizing eyeball navigation, lenses from Costa Del Mar, Harken, Oakley, Maui Jim, and Kaenon scored highest. They could be ranked in that order, although scoring was close for the last four. All except the Harkens can be made to fit most prescriptions. (Again, we should point out that brown or copper lenses from the other top performers in the lab likely would have scored higher on the water than the lenses tested.)

If we had the dough, we’d spring for

the Costas for our reef-spotting tool, but we’d look for a frame style with better peripheral view. A pair of Oakleys or Kaenons would make excellent everyday sailing shades. The Oakley’s low prismatic effect will appeal to foredeck crew or small-boat racers. If we weren’t so broke or absent minded, a pair of glass-lens Maui Jims or Hobies (with more light transmission than the ones tested) would be great leisure shades.

For our money though, a couple pairs of Harkens with polycarbonate lenses, one with brown tint for the boat, one with grey tint for the road or offshore are very tough combination to beat. ▲

CONTACTS

BOLLÉ, 800/222-6553
www.bolle.com

COSTA DEL MAR, 386/274-4000
www.costadelmar.com

GILL, 800/822-6504
www.gillmarine.com

HARKEN, 262/691-3320
www.harken.com

KAENON, 949/574-7918
www.kaenon.com

HOBIE, 888/462-4321,
www.hobie.com

MAUI JIM, 888/666-5905
www.mauijim.com

NIKE, 800/344-6453
www.nike.com

OAKLEY, 800/403-7449
www.oakley.com

OCEAN WAVES, 800/495-9283
www.oceanwaves.com

POLAR OPTICS, 800/959-9038
www.polaroptics.com

UNDER ARMOUR, 888/727-6687
www.underarmour.com

WEST MARINE, 800/262-8464
www.westmarine.com

High-end Handheld VHF Radios



Standard Horizon models float to the top in a field of eight priced from \$130 to \$350.

Like the inexpensive handheld VHF we reviewed in the April 2009 issue, high-end radios are handy to have as backups to a fixed VHF or to include in an emergency ditch bag. However, shelling out a few extra bucks for the high-end units will get you added features and upgrades, and a handheld VHF that is better equipped for duty as a primary VHF for coastal sailors. While handheld radios typically will not transmit and receive at distances as great as fixed models, they do have the portability factor going for them. Sailors who plan to carry only a handheld VHF would do well to invest in one of the high-end units reviewed here.

WHAT WE TESTED

Practical Sailor tested eight handheld marine VHF radios that we classed as high-end models, those priced from \$140 to \$350.

Maximum power output on a portable handheld marine radio is limited to 5 or 6 watts, and most

Best Choice
Standard Horizon HX850S

have a 1-watt, low-power setting for harbor use. We evaluated five 5-watt VHF—the Cobra MR HH425 LI VP, the Uniden MHS450 and MHS550, and the Standard Horizon HX500S-LI and HX600S-LI—and three 6-watt radios—the Standard Horizon HX750S, HX760S, and HX850S. Most of the test radios also had a mid-power setting.

The HX500S-LI and HX600S-LI are upgraded versions of previous Standard Horizon radios. The company's other three test entries are floatable VHF's.

All eight radios tested are lithium-ion battery-powered and are waterproof. They all are rated for submersion to 3 feet for 30 minutes, and the Uniden radios are rated for submersion to 4½ feet for 30 minutes.

All units come with three-year warranties (all batteries have one-year warranties) and a belt clip and have an external antenna connection and a jack for an optional external microphone, speaker, and/or headset. Only the Standard Horizon HX600S-LI and HX850S have DSC capability, a feature we prefer in any VHF.

As we go to press with this report, we are in the process of testing a latecomer, the Icom M36, which also fits this group. As soon as the test is complete, we will publish an update.

The HX750S was one of three Standard Horizon radios we tested that floats. All of the test radios are waterproof.

HOW WE TESTED

With batteries fully charged, each radio was run through a series of bench tests. We tested transmitter power, frequency accuracy, frequency stability, receiver sensitivity, audio output, and audio quality.

Transmitter tests were done at room temperature and at temperature extremes. Our equipment did not allow us to test for receiver selectivity, so we listed maker specs for this in the Value Guide on pages 14-15.

Display ratings were based on readability, the value of information shown, and the quality of the backlighting.

To confirm the radios were waterproof, they were submerged in fresh water for 30 minutes. To rate shock-proofing, each radio was dropped from a height of 4 feet onto concrete. For the battery-life test, each radio was allowed to run for 15 hours.

For more specifics on how we tested, check out the online version of this article at www.practical-sailor.com.

In the final analysis, we considered performance, cost, warranty, battery life, included equipment, recharge time, display, audio output, and features.

COBRA HH425

The Cobra MR HH425 LI VP is a mid-sized dual-band marine handheld solidly constructed on an aluminum die-cast frame. At 13.3 ounces, it was the heaviest radio tested.

The HH425 comes with an AC charger that requires only four hours to fully charge its 1,900-mAH lithium-ion battery pack. The Cobra offers the most battery capacity of all radios tested in this group and was one of three to go the distance in our battery life test. It also comes with a DC charger cord, belt clip, AA battery case, and wrist strap.

The Cobra's volume and squelch controls are top-mounted. One-button control, via one of the 10 pushbuttons, is available for transmitter power selection, call tone, channel changing, weather channel selection, quick-select



channel 16 or 9, band selection, and some scanning options.

Scan modes include numerical, memory, and tri-watch. Tri-watch scans channel 16 and two user-selectable channels. The HH425 can use all Canadian, international, and U.S. marine VHF channels, NOAA weather channels, and 15 general mobile service radios channels.

One feature on this radio we've not seen on any other marine handheld VHF is Cobra's "Rewind-Say-Again" function. This records the last 20 seconds of speech received on a selected channel. So should you miss the call and want to listen to it again, all you have to do is press the "REW" key. Our tests confirmed this works as advertised.

The HH425 also has dual-band function, meaning it can be used as a regular VHF or as a walkie-talkie-type device with GMRS radios.

The HH425 display is large for a handheld and shows a lot of valuable information, including transmitter output, battery level, and signal strength.

Transceiver performance was average. At temperature extremes, it went slightly off frequency but remained within industry and governmental standards.

Bottom line: For \$149, this is a brawny radio with a fast recharge time, a large display, and long battery life that doubles as a walkie-talkie—definitely a bargain.

STANDARD HORIZON FLOATERS

Standard Horizon introduced three floating handheld VHF's in 2008. To displace enough water to float, the radios combine relatively large cases with relatively light weight.

However, the design required some battery-size sacrifice to reach the floating point. Each of the three Standard Horizon floaters, the HX750S, HX760S, and HX850S, is powered by a 1,150-mAH lithium-ion battery pack, the smallest capacity-wise of all the radios we tested. The three came in at the mid to low end of the battery life performance test. All reached full charge after eight hours on

the supplied AC chargers.

Each of these each can use all Canadian, international, and U.S. marine VHF channels and NOAA weather channels.

Audio performance was outstanding for the trio. We measured 99 dBA in our output test, the highest of the radios tested.

The displays all use large numbers, sliding scales for volume and squelch levels, a low-battery indicator, and icons for varying transmitter power outputs.

Like some other Standard Horizons, the floating VHF's also have SOS strobe lights that can be seen up to a mile away, a handy safety feature for a portable radio. These radios also have some unique features that set them apart.

The Standard Horizon floaters compare favorably to the last floating portable VHF we tested, the Icom M34 (PS, January 2008). The Icom, while it lasted 12 hours in the battery life test, had less battery capacity, nearly double the charge time, weaker output, and a lower-rated display than the Standard Horizon units.

In November 2008, Standard Horizon noticed that some HX750S and HX850S radios showed stress cracks in the rear case and traced the problem to excessive tightening of the screws during assembly. The company resolved the problem and issued a voluntary safety check to consumers. According to the company, about 40 radios have been returned with this problem, but no models currently on the market were affected. (If you find a model with this problem, call 800/283-7839 ext. 6700.)

HX750S: An unexpected feature on the HX750S is a water-temperature sensor. It worked as advertised, showing the temperature on the display. While there might be a situation when knowing water temp could aid in survival, the testers were not keen about a feature that required soaking a radio (even a floating one) in sea water

for several minutes.

All functions of the HX750S are controlled with 11 front-mounted pushbuttons. We prefer knobs for volume and squelch. One button control is available for transmitter power, channel changing, weather channel selection, quick 16 or 9, and some scanning options. Scan modes are dual watch, tri-watch, memory, and priority. A preset key can be used to store and quickly recall up to 10 channels.

Transceiver performance was top notch, and the battery lasted longer than some batteries with higher capacities.

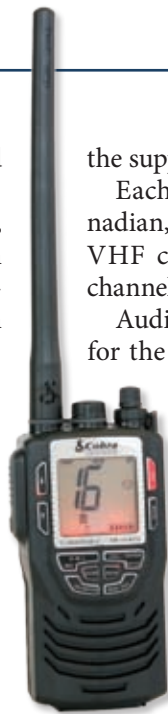
Bottom line: It floats, has good transceiver performance, decent battery life, superior audio output, and a reasonable \$139 price tag, making it the Budget Buy.

HX760S: Like the HX750S, the Standard Horizon HX760S features a built-in water thermometer. It was also the only test radio that could interface with a Bluetooth headset.

The HX760S, which comes with the Standard Horizon BH-2 Bluetooth headset and headset charger, offers hands-free operation when set up for VOX (voice operated transmit) communications. It also can be set up for push-to-talk transmissions.

Testers followed maker directions for coupling the headset and radio, and then made some voice calls to another VHF radio. The VOX technology activates the headset when the user starts to speak, so it is not necessary to push any buttons. We could hear the other radio well in the headset, and the tester on the other end reported hearing our transmissions with little to no static.

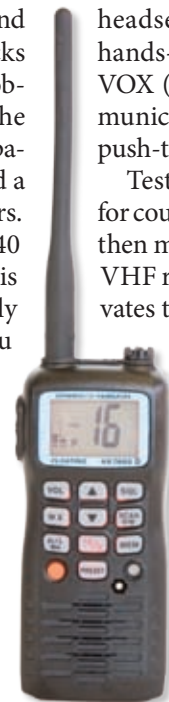
All functions of the HX760S are controlled with 11 push-buttons. One button control is available for transmitter power, channel changing, weather channel selection, quick 16 or



Cobra HH425



Standard Horizon HX750S



Standard Horizon HX760S

AS VALUE GUIDE EXPENSIVE VHF HANDHELD RADIOS

MAKER	COBRA	STANDARD HORIZON	STANDARD HORIZON	STANDARD HORIZON
MODEL	MR HH425 LI VP	HX500S-LI	HX600S-LI ✓	HX750S \$
PRICE	\$150	\$130	\$166	\$140
PRICE SOURCE	consumersmarine.com	thegpsstore.com	consumersmarine.com	consumersmarine.com
12v DC CHARGER and AC CHARGER	Included	Included	Included	Included
AA OR AAA BATTERY PACK	Included	Optional	Optional	Optional
BATTERY CAPACITY	1,900 mAH	1,700 mAH	1,700 mAH	1,150 mAH
BATTERY MODEL NO.	110-010	FNB-V98LI	FNB-V98LI	FNB-V99LI
BATTERY REPLACEMENT COST	\$25	\$48	\$48	\$48
MAXIMUM CHARGE TIME	4 hours	8 hours	8 hours	8 hours
CLAIMED / TESTED OPERATION TIME	14 / 15 hours	16 / 15 hours	16 / 15 hours	16 / 13 hours
SCRAMBLER	N/A	Optional	Optional	N/A
WX ALERT	Yes	Yes	Yes	Yes
FREQUENCY BANDS *	M, GM	M	A, AM, FM, M	M
CHANNEL COMMENTS	No	Yes	Yes	Yes
DSC CAPABILITIES	None	None	DSC distress	None
UNIT SIZE (W x H x D)	2.7 x 4.9 x 1.6 inches	2.5 x 4.3 x 1.4 inches	2.6 x 4.3 x 1.4 inches	2.5 x 5.7 x 1.7 inches
WEIGHT	13.3 ounces	11.1 ounces	11.3 ounces	10.7 ounces
TX SETTINGS	5, 3, 1 watts	5, 2.5, 1 watts	5, 2.5, 1 watts	6, 5, 2.5, 1 watts
SELECTIVITY	60 decibels	65 decibels	65 decibels	70 decibels
AUDIO OUTPUT (1 FOOT)	93 dBA	95 dBA	96 dBA	99 dBA
RATINGS				
TRANSMITTER POWER STABILITY	Good	Excellent	Excellent	Good
TRANSMITTER FREQUENCY STABILITY	Fair	Good	Excellent	Good
RECEIVE SENSITIVITY	Good	Excellent	Excellent	Excellent
DISPLAY RATING	Excellent	Good	Good	Excellent
AUDIO QUALITY	Good	Good	Good	Good
DROP / SUBMERSION TEST	Pass / Pass	Pass / Pass	Pass / Pass	Pass / Pass

★ Best Choice \$ Budget Buy ✓ Recommended

* Aircraft (A), AM Broadcast (AM), Family (F), FM Broadcast (FM),

9, and scanning. There are four scan modes: dual watch, triple watch, memory, and priority. A preset key can be used to store and quickly recall up to eight favorite channels

Testers rated the HX760S's audio and transceiver performance highly, and battery life was a respectable 11 hours. It was the lightest radio tested.

Bottom line: Bluetooth capability doesn't come cheap. The \$349 price is a bit steep, in our opinion, but those who value hands-free communication will find the HX760S to be a quality radio.

HX850S: The Standard Horizon HX850S has a self-contained GPS receiver and full DSC capability, a rare find in a handheld. The HX850S can transmit and receive DSC distress calls, and can handle all ships, individual, and group calls, as well

as position requests or position reports. It was the only test radio capable of displaying current position data.

GPS information can be displayed in two modes. The position mode shows time and latitude/longitude while the navigation mode adds the boat's speed over ground (SOG) and course over ground (COG).

The push-to-talk switch and DSC buttons are side-mounted. All remaining functions are controlled with 11 push-buttons. One button control is available for transmitter power, channel changing, weather channel selection, quick 16 or 9, and scanning options. Scan modes include memory and priority.

Transceiver performance was very good, and audio quality was rated Good. Battery life was the radio's main

drawback: It logged only eight hours, a tradeoff for a radio that floats and has full-function GPS and DSC. If the GPS function is disabled, the company claims, battery life increases to 11 hours.

Bottom line: This innovative handheld gets our Best Choice rating for combining a floating VHF, top-notch performance, and full DSC capability. However, its battery life leaves much to be desired, so we recommend keeping charged back-up batteries on hand.

STANDARD HORIZON UPDATES

Two Standard Horizon handheld VHF's were updated with lithium-ion batteries since we tested them. *Practical Sailor* reviewed the nickel metal hydride-powered HX500S and HX600S units in July

	STANDARD HORIZON	STANDARD HORIZON	UNIDEN	UNIDEN
	HX760S	HX850S ★	MHS450	MHS550
	\$350	\$220	\$160	\$185
	westmarine.com	consumersmarine.com	consumersmarine.com	consumersmarine.com
	Included	Included	Included	Included
	Optional	Optional	Optional	Optional
	1,150 mAH	1,150 mAH	1,400 mAH	1,400 mAH
	FNB-V99LI	FNB-V99LI	BP-550	BP-550
	\$45	\$45	N/A	N/A
	8 hours	8 hours	3 hours	3 hours
	10 / 11 hours	7 (with GPS) / 8 hours	12 / 12 hours	12 / 11 hours
	N/A	N/A	N/A	N/A
	Yes	Yes	Yes	Yes
	M	GPS, M	M	A, AM, F, FM, M
	Yes	Yes	Yes	Yes
	None	Full (See text)	None	None
	2.5 x 5.7 x 1.7 inches	2.5 x 5.7 x 1.7 inches	2.7 x 4.4 x 1.3 inches	2.7 x 4.4 x 1.3 inches
	10.8 ounces	12 ounces	11.8 ounces	12 ounces
	6, 5, 2.5, 1 watts	6, 5, 2.5, 1 watts	5, 2.5, 1 watts	5, 2.5, 1 watts
	70 decibels	70 decibels	70 decibels	72 decibels
	99 dBA	99 dBA	88 dBA	88 dBA
RATINGS				
	Good	Good	Good	Good
	Good	Good	Good	Good
	Excellent	Excellent	Fair	Fair
	Excellent	Excellent	Good	Good
	Good	Good	Good	Good
	Pass / Pass	Pass / Pass	Pass / Pass	Pass / Pass

* Land Mobile (LM), Marine (M),

* General Mobile Radio Service (GM), GPS (GPS)

2006 and took a look at the updated releases, the HX500S-LI and the HX600S-LI, for this test. The HX600S was named Best Choice among high-end portable VHF's in the 2006 review.

The switch to lithium-ion batteries means the LI models offer more capacity (1,700-mAH) than their predecessors, reach full charge faster (about two hours quicker with the supplied AC charger), and offer more charge cycles. The portable LIs also are lighter weight and more compact than the original models.

In our battery life tests, the HX500S-LI lasted two hours longer than the HX500S we tested. Both the HX600S and

HX600S-LI went beyond the 15-hour test cutoff.

The HX500S-LI and HX600S-LI both have an SOS strobe light. Both can use all Canadian, international, and U.S. channels, and offer dual watch, tri-watch, priority, and memory scan modes. A preset key can be used to store and quickly recall up to eight favorite channels.

A re-hatched version of an older model, the HX500S-LI can be found at a bargain price. Following the release of the Standard Horizon floaters, the HX600S-LI was discontinued. However, it is still available from



Standard Horizon HX500S-LI



Standard Horizon HX600S-LI

distributors and can be had for a good deal.

HX500S-LI: The HX500S-LI operates on the marine band only. The volume knob is top-mounted. Side-mounted pushbuttons control power, squelch, and push-to-talk. Eight other pushbuttons control the other functions.

The HX500S-LI display uses large channel numbers and shows transmitter power and the selected channel, its name, use, and group.

The HX500S-LI earned mostly Excellents in our bench tests.

Bottom line: With its low price, rugged construction, and very good performance, the HX500S-LI is a good deal.

HX600S-LI: The HX600S-LI is one of only a handful of handheld radios on the market with DSC capability. If it is sitting in its charger (plugged in or not) and the charger is receiving NMEA 0183 position data from a GPS unit, the HX600S-LI will transmit vessel position data along with the boat's Maritime Mobile Service Identity (MMSI) number when making a DSC emergency call. The position data is saved in the radio's memory as well, a handy feature in an emergency.

The HX600S-LI has a top-mounted volume knob and side-mounted pushbuttons for power, squelch, and push-to-talk. Pushbuttons also control transmitter power, channel changing, weather channel selection, scanning, and band choice. The HX600S-LI's display uses large block channel numbers and shows channel name, channel group, and transmitter power.

Bottom line: The HX600S-LI is well constructed, did well in our performance tests, has a long battery life, and features reception on broadcast and aircraft bands, a bonus in an emergency radio. Although it's been discontinued, models are still available, and for \$166, we still think it's a good buy and recommend it.

UNIDEN MHS450

The Uniden MHS450 is solidly constructed and partially covered by protective rubber padding. The unit fits well in hand and weighs in the mid-range of our test radios.

The MHS450 comes with an AC charger that will bring an empty battery up to full charge in a very short three hours. Other accessories included are a DC charger, wrist strap, and AAA battery case.

Top-mounted knobs control volume and squelch, and eight pushbuttons control transmitter power, channel changing, weather channel selection, quick 16 or 9, and all scanning options. Scan modes include dual watch, triple watch, and weather alert. You can also memory select various channels and monitor them in numerical order. This radio can use all Canadian, international, and U.S. channels.

The MHS450 display uses moderately large numbers and medium-sized letters. Power level and battery level also are indicated.

Overall performance of the MHS450 was average, but the unit lasted a respectable 12 hours in our battery life test.

Bottom line: The Uniden MHS450 is a solidly constructed radio that is held back by weak audio output.



Uniden MHS450

UNIDEN MHS550

The Uniden MHS550 is a multi-band marine handheld radio capable of transmitting and receiving on the marine band and the family radio service band. It will also receive on the AM and FM broadcast bands and aircraft band.

The radio is constructed from die-cast aluminum and has protective rubber padding. It comes with an AC charger that will bring the standard 1,400 mAh lithium-ion battery from empty to full in only three hours. Other accessories include a DC charger cord, wrist strap, and AAA battery case.

Top-mounted knobs control volume and squelch. Eight push-buttons control the remaining functions. One-button control is available for transmitter power, channel changing, weather channel selection, quick 16 or 9, and some scanning options. Scan modes include dual watch, triple watch, and weather alert. You can also memory select various channels. This radio can use all Canadian, international, and U.S. channels.

The MHS550 screen displays the selected band, channel, channel name, power level, and battery level.

Overall performance of the MHS550 was average. Audio performance was somewhat anemic: 88 dBA. This battery lasted for 11 hours in the test.



Uniden MHS550

Bottom line: This is a well-constructed radio with decent transceiver performance. Weak audio output is a drawback.

CONCLUSION

Standard Horizon made a sweep of the high-end, portable VHF test. The HX850S garnered the Best Choice award for its unique features and top-notch performance. We'd like to see better battery life, but it's a tradeoff we're willing to make for full DSC capability, a built-in GPS receiver, and excellent performance.

The Budget Buy HX750S floats and offers good transceiver performance, outstanding audio performance, good battery life, and the lowest price. The HX600S-LI—the nickel metal hydride model of which was Best Choice in previous tests—gets the *PS* recommendation for its lengthy battery life, multi-band function, good output, and low price. ▲

CONTACTS**COBRA**773/889-3087, www.cobra.com**STANDARD HORIZON**, 714/827-7600, www.standardhorizon.com**UNIDEN**www.uniden.com**BUYER'S CHECKLIST****PS Shopping List for the Ideal Handheld VHF Radio**

We put together a list of features that our ideal handheld VHF radio would have. Some of these features are absolute necessity while others are nice-to-have items.

1. Rugged, waterproof construction: The nature of handheld marine electronics require that they be able to withstand being dropped—on decks, cabin soles, docks, etc.—and being splashed, used in the rain, or accidentally dipped in the drink.

2. Excellent transmit and receive properties: All the features in the world won't help if the radio doesn't operate well.

3. Long battery life: The longer the better—10 to 12 hours is acceptable, 15+ is preferred.

4. Quick recharging: Anything more than overnight (10 hours) is too long.

5. Reasonable replacement battery cost: It's always a good idea to keep an extra battery on hand and fully charged.

6. Optional AA or AAA battery tray: VHF's usually don't operate as well when using AAs or AAAs, but these are easier—and cheaper—to stock up on for emergencies.

7. Readable display screen in all lighting conditions.

8. Features: While we find some features to be over the top, others add to the safety benefits of a handheld VHF. A radio with DSC capability, built-in GPS receiver, SOS strobe light, and aviation-band reception will serve well in an emergency.

9. Long warranty, backed by good customer service.

Tank Sensor Update

Internal tank monitors get a check up after 9 months in faux poo.

In the spring of 2008, *Practical Sailor* installed and tested seven internally mounted liquid-level sensors and their mated remote monitor panels. Testers evaluated them for ease of installation, quality of workmanship and materials, features, performance, and accuracy. The results were reported in the May 2008 issue. (Externally mounted tank sensors were evaluated in the February 2008 issue.)

In an attempt to replicate real holding-tank conditions for that test, we half-filled a 16-gallon polyethylene tank with water, then added salt, bananas, rolls of toilet paper, and a couple boxes of instant mashed potatoes. It was a goopy mess.

Testers let the tank, with sensors attached, marinate for nine months in the humid, warm Florida weather. When we checked in on the setup, our “fake” holding-tank effluent had grown into a thick, dark, smelly, liquid with an oily, foamy layer on top—just what we were looking for to long-term test the internal probes. But unlike tanks installed on boats kept in the water and used often, our test tank received only occasional “sloshing” over the nine months. However, we were sure to shake things up a bit before re-testing the sensors for this update.

Testers applied power to all kits and observed the readings on the moni-



The fake effluent developed into a smelly, dark liquid after nine months in the test tank.

tors. We then sloshed the lumpy liquid around to simulate the motion of a boat, read the monitors again, and filled the tank with more water to see whether the sensors would indicate the change in liquid level.

WHAT WE TESTED

The seven kits being tested can be categorized by the type of sensor they use. Those that used some form of float sensor were the SeaLand TankWatch 1, Dometic DTM4, Groco TLM Series, and Wema SHS-8. Two used air pressure for reading: Fireboy-Xintex PTS and Hart Systems Tank Tender. And the BEP Marine’s TS1 sender uses ultrasonic technology. All should work on standard composite, polyethylene, or aluminum tanks.

Most of the products are rated for wastewater holding tanks, fresh, or “sweet” water tanks, and aluminum or metal fuel tanks for diesel. Gasoline tanks require different sensors.

Some of the single-tank sensors reviewed here also come in multi-tank configurations. All require access to the top of the tank to mount the sensor.

LONG-TERM TEST RESULTS HART TANK TENDER

The non-electric Hart Systems Tank Tender uses a pneumatic tube and a



Hart Tank Tender



Dometic DTM4

needle gauge. We switched the pump to “purge” to remove any debris from the tube, switched back to tank No. 1 and got an accurate reading. It also gave an accurate reading when filled. It was not affected by the goop.

DOMETIC DTM4

The DTM4 comes with three float switches on three adjustable (by cutting) plastic tubes, representing empty, low, mid-level, and full. These are wired to a monitor with corresponding LEDs. This mid-priced device has been around for some time.

Our test unit failed to register at the mid-full level after we added liquid. Upon inspection after the test, testers noted that the gunk had left a greasy sludge on the sensor’s vertical float slide that may have prevented it from rising. This may not be an issue with freshwater tanks, but could pose a problem if you leave effluent sitting in your holding tank for any length of time. According to Dometic, this is not a common problem and the regular motion of a boat, even when moored, should prevent this from occurring.

PS VALUE GUIDE INTERNAL HOLDING TANK-SENSOR KITS

Manufacturer	BEP MARINE ★	DOMETIC	FIREBOY-XINTEX ↗	GROCO	HART SYSTEMS ↗	SEALAND	WEMA \$	
Sensor / Monitor	TS1 / 600-TLM	DTM4	PTS / LLM-1	TLM	Tank Tender	TankWatch 1	SHS-8 / HTG	
Kit price	\$380	\$265	\$143	\$275	\$421	\$80	\$97	
Price source	BEP Marine	Dometic	defender.com	go2marine.com	defender.com	westmarine.com	wemausa.com	
No. of tanks	3	1	1	1	2	1	1	
Display (H x W)	2 5/8 x 3.5 in.	3.25 x 3.25 in.	2.25 in. diameter	2.75 x 3.5 in.	6 x 4 in.	1 5/8 x 2 in.	2.5 in. diameter	
Sensor type	Ultrasonic	3 floats	Pneumatic	2 floats	Pneumatic	1 float	1 float	
Display type	Digital	4 LEDs	5 LEDs	2 LEDs	Needle	1 LED	Needle	
Added function	Alarm	Optional auto shutdown	None	Pump out	Purge	None	None	
ORIGINAL TEST RATINGS	Accuracy	Excellent	Good	Good	Good	Excellent	Good	Excellent
	Ease of install	Excellent	Fair	Excellent	Good	Good	Excellent	Good
	Instructions	Good	Good	Excellent	Good	Good	Excellent	Excellent
Accuracy after 9 months	Excellent	Fair	Excellent	Poor	Excellent	Good	Excellent	

↗ Recommended \$ Budget Buy ★ Best Choice

GROCO SERIES TLM

Contrary to our expectations, the Groco did not fare very well. The internal mechanism on this unit is two free-floating mercury switches that are attached to a probe with 2-inch wires. The monitor has two LED lights marked “¼” and “¾,” which should illuminate when the “Show Level” switch is pushed.

During the check up, only the ¼ LED lit up after sloshing the tank, tapping the monitor, and adding water. PS testers speculated that some of the floating debris might have prevented the mer-

cury float switch from closing the contact. However, we discovered the actual problem when we pulled the sensors out of the tank: Some chemical reaction had eaten away the rubber covering on both float switches and was working on the probe tube.

According to Groco, this failure was due to a problem with the coating mixture, and the damage would be covered by the unit’s warranty.

SEALAND TANKWATCH 1

Sealand TankWatch takes the inexpen-

sive approach with one float switch at the top of the tank and a simple red LED marked “Tank Full” on the monitor. Since the short probe was not affected by our goop, it worked fine when the tank was absolutely full, but this type of monitor is of limited value to a cruising sailor.

WEMA SHS-8

The Wema kit comprises a float switch mounted on an 8-inch vertical stainless-steel tube, encased in a 1½-inch protective stainless-steel pipe.

In the May 2008 review, this kit got *Practical Sailor’s* nod as the Budget Buy because of its reasonable price, heavy-duty construction with protection for the float and the continuous-read, responsive needle-gauge indicator panel. Again, it gave the correct readings during our checkup test, and the float was



.....
The rubber coating on the Groco float sensors we tested suffered a chemical breakdown. The maker said the problem was not common and would be covered in the warranty.

not fouled with the goop.

FIREBOY-XINTEX PTS/LLM

The PTS/LLM uses pneumatic technology (air pressure) and has no moving parts that can become fouled. It was our Best Choice kit in the May 2008 review because of the new pneumatic probe with encapsulated microprocessor sender and the simple electronic level gauge.

A receiver screwed on the top of the tank is attached to a cut-to-length 1-inch plastic tube inserted in the tank. In our test, this tube was not fouled in any way, and the five-LED monitor (marked "E," "1/4," "1/2," "3/4," and "F") responded correctly to the various tank levels.

Care should be taken in figuring how high the sender unit sits on the top of the tank and exactly how deep the air tube should be cut. Tube sender sizes are available from 7 inches to 36 inches in 1-inch intervals. Note that the tube can be cut shorter if necessary and the sender re-calibrated.

BEP MARINE'S TS1

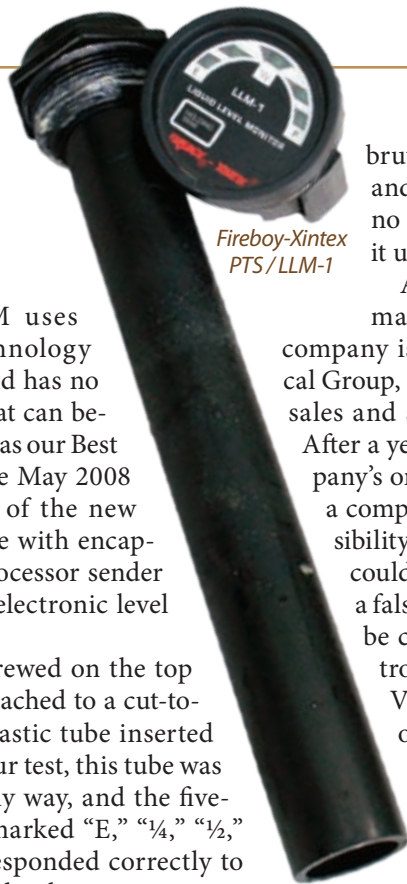
BEP's TS1, tested with the 600-TLM monitor display, had the most unique and sophisticated system of any tank monitor we tested. It uses an acoustic sonar technology to read the amount of liquid in a tank. The ultrasonic technology is extremely accurate, and the digital screen shows liquid levels three ways: in gallons, as a percentage full, and with a bar graph.

In the May evaluation, *PS* testers were concerned that the sensor was too delicate, too complicated, and being new (released in late 2007), too untested. However, after nine months in the goop and the

BEP Marine
TS1



Fireboy-Xintex
PTS/LLM-1



brutal Florida heat, it fired up and worked flawlessly. There is no way for the "gunk" to foul it up.

Although BEP products are made in New Zealand, the company is part of Marincó Electrical Group, a U.S.-based company with sales and service offices worldwide.

After a year in production, the company's only reported concerns were a compatibility issue and the possibility that the TS1's nitrite gasket could be over-tightened and give a false reading. The TS1 may not be compatible with some electronic analogue systems, like Vessel View, which is popular on powerboats. BEP is working on an updated model that will be compatible with all systems. Also, new units have a rubberized cork gasket that has solved the gasket problem, BEP said.

CONCLUSIONS

Practical Sailor does not recommend float-switch level indicators in holding tanks because of the propensity for fouling, especially if the tanks are left standing with solid wastes.

After nine months of testing, the Fireboy-Xintex pneumatic kit, with the single tank indicator and costing just over \$140, is highly recommended. It is simple, has no moving parts, and includes a compact, easy-to-read liquid level display. The Hart Tank Tender is a quality, tried and true product. It's easy to install with a simple thin nylon pneumatic tube that can be run up to 1,000 feet and a precise monitor panel that will display multiple tanks and does not require any power. At more than \$400, it's a little pricey, but we recommend it for those cruising away from home for long periods.

The Wema was the only kit ringing in under \$100. It's accurate and fairly easy to install, so it gets the Budget Buy nod.

The BEP TS1/600-TLM system really intrigued our *PS* testers. At \$380, it is not cheap, but the sonar technology worked flawlessly, was easy to install, and has a host of interesting features and functions. It must be factory programmed for your tanks, but the sender can be used for fuel and can be set up to work with other indicator monitors. The 600 TLM will monitor up to three tanks with selectable labels in English, adjustable high-low level alarms, and is backlit for easy nighttime viewing. It seems reliable and really fits those who love new electronic gadgets. It's the Best Choice.

ON THE HORIZON

Since our test began in 2008, some new tank monitoring systems have hit the market. Among them is marine toilet maker Raritan Engineering's (www.raritaneng.com) recently released Smart Tank Monitor, which is to be used with the HT-100 and HT-100P sensors. This system uses air pressure to measure the liquid level, similar to the Fireboy-Xintex we tested, and has a digital display. The internal sensor is designed to work on all types of tanks and in all types of liquids.

We plan to test the Smart Tank along with new external tank sensors. Look for the report in an upcoming issue. ▲

CONTACTS

BEP MARINE INC. (MARINCO)
770/226-9600
www.bepmarine.com

DOMETIC/SEALAND
800/321-9886
www.dometicsanitation.com

FIREBOY-XINTEX
866/350-9500
www.fireboy-xintex.com

GROCO
410/712-4242
www.groco.net

HART SYSTEMS INC.
253/858-8481
www.thetanktender.com

WEMA
954/463-1075
www.wemausa.com

Performance boosters from Power Services (white bottle) and Stanadyne are flanked by products from Biobor, Star brite, Racor, and ValvTect. Only the biocides proved effective at beating bacteria and fungi.



Biocides vs. Bugs

PS testers dive into diesel additives test.

Whenever sailors talk about dirty diesel, advice springs forth regarding the best type of filter, the best stabilizing additive for long-term storage, the best additive for cleaning the tank, and sometimes, the suggested biocides for killing the bacteria and fungus that commonly infect diesel tanks. Advice against certain additives is also common, as are products that claim to cure “tank algae,” even though they have no real proof of effectiveness.

It is all very confusing. What is certain is that we need clean fuel to keep our engines running smoothly, and to keep fuel clean, it helps to know how it got dirty in the first place.

Dirty fuel itself is pretty rare in the United States, at least as it leaves the refinery. Heavy-duty trucks ply our highways reliably with very few filtration problems, day-in and day-out. Diesel fuel, as produced in the refinery, has some inherent chemical instability and can polymerize and form sludge in the presence of oxygen. This can also happen in airtight storage, although to a lesser extent.

To reduce these problems, the conventional wisdom and common practice is to maintain storage tanks completely full and to treat them with the storage additive that contains chemicals to inhibit this polymerization. These additives are quite effective and can extend a storage life of diesel fuel to several years; however, they are not perfect, and a certain

amount of sludge formation is to be expected. If this is the only mechanism of sludge formation, the buildup will be easily managed by filtration and fuel polishing (routinely cycling fuel through a filtration system).

Biological contamination is another matter. Recreational boats don’t operate like trucks; they often stay put for months at a time in a warm, humid environment. Backup generators and fuel storage depots face similar extended non-use cycles. Metal working fluids (oil/water mixtures) also circulate in a warm, open environment. All of these are subject to biological infection, and much of the research concerning fuel biocides is aimed at resolving these types of industrial problems.

INSIDE THE FUEL TANK

Diesel fuel biodegrades easily. Given the presence of a small amount of water and exposure to bacteria and fungal spores—found in the fuel itself or, more rarely, introduced from the atmosphere—substantial amounts of biomass form amazingly fast. Only a trace of water is required, free or emulsified. Although true condensation inside a fuel tank is very limited under most circumstances, fuel almost inevitably absorbs small amounts of water.

Through the course of a sailing season—with its cyclical variation between daytime high temperatures and nighttime lows—this water will eventually precipitate inside the tank. Add warm

weather and gentle agitation as the boat rocks, and you have an effective incubator for bacteria and fungi.

A big part of the battle against bugs then, is eliminating water from fuel. A water-separating filter is the most common defense against water. A variety of additives claim to help disperse or demulsify water in diesel fuel, helping to aid in water filtration. This test looked solely at the ability of additives to kill bacteria and fungi. A powerful defense against fuel contamination of any kind, as we have stated many times, is an easily accessible fuel tank with large inspection ports for cleaning (“Diesel Fuel Tank Replacement,” May 2007).

At the onset of an infection, filtration seems to help. The filters will catch the larger clumps of bacteria, but individual organisms are much smaller than the finest filtration. Bacteria and spores measure only 0.1 microns, so even ultra-fine filters rated at 1-micron (most secondary filters on small marine diesels are no finer than 2 microns), pass enough organisms to continue the infection.

Eventually, substantial biomass accumulates inside the tank, and either a change in fuel chemistry or vigorous mixing on a rough day will knock some of it loose, and the sailor discovers his filters clogged far sooner than he expected. Often, it happens at the worst possible moment—a good argument for a twin-filter system with a pressure gauge for monitoring filter status and a valve that lets you switch filters on the fly.

Biological growth is instantly recognizable as a brown, gray, or black mucous-like substance that coats the inside of the tank, fuel lines, and filter elements. If the sludge collecting in your filter consists of fine particulates, rust, or tarry material that leaves a black, sticky residue on your fingers, you’re probably not looking at biological contamination. You may need to clean your tank, and you are a good candidate for fuel filtration

AS VALUE GUIDE DIESEL ADDITIVES		BIOBOR JF ✓	RACOR BIOCIDES ✓	STANADYNE	STAR BRITE ✓	STAR BRITE	VALVTECT ✓
Manufacturer		Hammonds	Racor	Performance Formula	Biodiesel	Star Tron Diesel	Bioguard
Product							
Price*		\$12	\$15	\$7	\$21	\$20	\$20
Quantity		8 oz.	16 oz.	16 oz.	16 oz.	16 oz.	16 oz.
Shock dose		.025 oz./ gal.	.025 oz./ gal.	.27 oz./ gal.	.03 oz./ gal.	.03 oz./ gal.	.03 oz./gal.
Maintenance dose		.0125 oz./ gal.	.0125 oz./ gal.	.27 oz./ gal.	.017 oz./ gal.	.03 oz./ gal.	.017 oz./gal.
Shock cost		4¢/gal.	2¢/gal.	12¢/gal.	4¢ /gal.	4¢ /gal.	4¢ /gal.
Maintanace cost		2¢ /gal.	1¢ /gal.	12¢ /gal.	2¢ /gal.	4¢ /gal.	2¢ /gal.
Claims		Biocide	Biocide	Better performance	Biocide	Disperse bacteria, ease filtration	Biocide
Registered pesticide		Yes	Yes	No	Yes	No	Yes
Phase (Solubility)		Oil, thick, mix with diesel before adding.	Water/oil emulsion	Oil	Water	Water	Oil
Microbe count/ "A" Culture**	24 hr.	10,000	10,000	1,000	0	100	100
	48 hr.	10,000	10,000	1,000	0	1,000	100
Microbe count/ "B" Culture	24 hr.	0	0	10,000	2,000	10,000	2,000
	48 hr.	0	0	10,000	2,000	10,000	2,000
✓ Recommended		*Average retail price. **Two control samples, one diesel and one biodiesel, showed biomass counts of 10,000 at all sample periods.					

and stabilizing additives, but bugs are not your main problem. However, if the material is slimy—in severe cases slimy stalactites of goo will hang from the filter—you have a biological infection.

BIOCIDES

A commonly prescribed cure for a serious microbial infection is to kill it with biocides. Unlike a sinus infection that will pass as your body rallies, a substantial biological infection of your fuel tank is unlikely to fix itself through filtration alone. But killing the bugs is only half the battle. The sudden release of dead bacteria from the surfaces of the tank can raise other problems. This surge of slime clogs filters, causes fuel starvation, or has other potentially harmful results.

In a badly infected fuel tank, the dead bodies will probably have to be mechanically removed, either through filtration or a thorough tank cleaning and fuel change. There are many chemicals that claim to be able to clean your tank or to help keep your fuel clean, but the mass of solids present in a badly infected tank can far exceed the safe application of this approach. So, if you do decide to attack a severely infected tank with a biocide, don't do it right before you're planning a

tank-agitating voyage unless you plan to follow it with aggressive filtration, a fuel change, or tank cleaning.

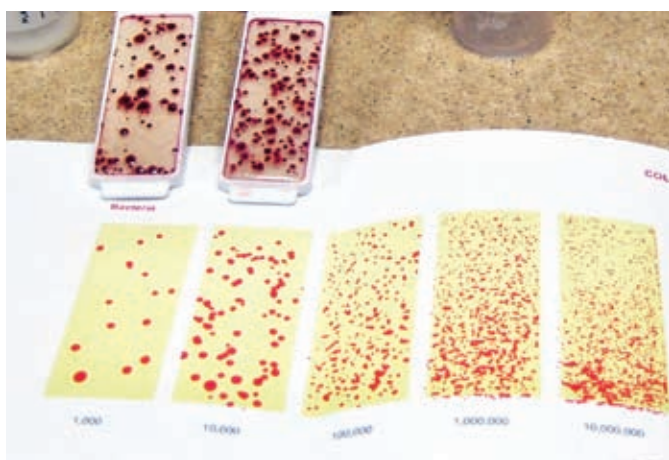
Magnetic bug killers receive considerable anecdotal press. *Practical Sailor* tested two widely available units—De-bug and Algae-X—in the April 15, 1997 issue and concluded they had no observed effect on microbial growth. As a part of the 1997 trial, a biocide was also tested for comparison, and this was found to be very effective.

Any manufacturer claiming its product is a biocide must register that formulation with the U.S. Environmental Protection Agency (EPA) as a pesticide or anti-microbial. As you might imagine, this is an involved and strictly regulated process. As a result, there are far fewer formulations than there are products on the market. Most products piggy-back on existing registrations, and in our research, we found that the products readily available to boaters have one of four types of active ingredients, and these ingredients vary in their solubility in fuel and water: dioxaborinanes, dithiocarbamates, morpholine and compounds, and thiocyanates. (See table, page 22.) Products within any registration are virtually the same and can be expected

to deliver similar results.

The conventional thought is that water-soluble products give a better quick-kill, as they enter the phase where the micro-organisms live. Fuel-soluble products may be better for maintenance dosing, as they blend easier with the fuel and better reach all portions of the fuel system. While these subtleties are important when treating huge industrial storage tanks, they may not apply to recreational boats. All of these products have some solubility in both water or oil, and should mix fairly well in a boat, which has a relatively tiny tank (compared to industrial tanks) with contents that are being sloshed around.

Biocides are pesticides and as such, aren't good for you. Users should carefully read the Material Safety Data Sheets (available online) for these products before use. The Occupational Safety and Health Administration (OSHA) regulates their use in metal working fluids where workers are likely to be continuously exposed to vapors and mists. Infrequent users are advised to wear gloves when handling the concentrate. It is the concentrated biocide, not the resulting diesel fuel mixture, that is potentially harmful.



BIOCIDES USED TO COMBAT BACTERIA IN DIESEL		
PRODUCT	ACTIVE INGREDIENT	WATER OR FUEL SOLUBLE
Bio-Bor JF	Dioxaborinanes	Fuel
Ako-Nobel/ALCO Aquatreat DM-30* Pri-Ocide* ValvTect Bioguard Star brite Bio Diesel FPPF Kill-em*	Dithiocarbamates	Water
Power Service Bio-Kleen*	Morpholine and compounds	Water and Fuel
Racor Bioguard	Azole / Thiocyanates	Water

* Not tested; Star brite Star Tron is not a biocide and so is not listed here

The control samples were tested after being shaken (left slide) and not shaken (right slide) to observe the effect. Both cultures gave similar results. Four different types of biocide are used to combat bacteria in diesel (table, above right).

HOW WE TESTED

Testing was straightforward: Find some infected fuel and see what killed bugs and what didn't. Absolute victory is the aim; as any survivors are likely to repopulate the tank. The contaminating organisms were collected from two diesel fuel tanks. These were further conditioned to ultra-low sulfur fuel oil over a period of three weeks and labeled as "Culture A" and "Culture B." Examination under a microscope showed a variety of bacterial and fungal species in each. Although some people speak of "algae" in their fuel, the critters typically responsible for diesel fuel degradation are fungi or bacteria, which can live on a diet of hydrocarbons without any light for photosynthesis.

The contaminated test fuel was ultra-low sulfur from a major refiner. Differences in biodegradability between different refinery batches are relatively minor. However, switching from one fuel source to another can sometimes cause all or a portion of the biomass to become dormant and slough-off the tank walls. It is as if the favorite lunch special has suddenly been pulled from the menu.

For one of our controls, we included biodiesel fuel. Our sample was typical of what is available in the market. Independent research suggests that bio-degradability of biodiesel should be comparable to ultra-low sulfur diesel, but our results were quite different; we found that the bugs grew nearly 10 times as fast in the

biodiesel mixture, even though they were not bugs conditioned to or specifically chosen for that ability. Growth then suddenly stopped, for no apparent reason. This behavior has been observed by other researchers and is not well understood.

After the conditioning period, test tubes were prepared with 10 milliliters of contaminated water, 140 milliliters of diesel fuel or B-20 mixture, and the manufacturer recommended dose of biocide. The tubes were inverted three times to simulate the minor amount of mixing present as a tank is filled or the boat is moved, but they were not vigorously shaken. Control tubes containing each infected diesel and B-20 sample were tested for the presence of bacteria to establish a baseline for untreated fuel. Relative microbial counts of control and test cultures were determined through the use of dip-slides prepared to be reactive to both bacteria and fungus. All slides were incubated at 80 degrees, and observations were made at 12-hour intervals.

BIOBOR JF

Texas-based Hammond Technical Services serves everything from the pipeline to military markets. Biobor JF is promoted as effective in diesels and jet fuels, as well as light fuels and transmission oils. Hammond also sells a Hum-Bug Detection Kit to check for fungi or bacteria. Its registered biocide is a dioxaborinane, the

same as Star brite Bio Diesel. This is a thick product that should be mixed with diesel before adding to your tank.

Bottom line: Biobor was one of two products that allowed no microbe growth the Culture B. This is a Recommended product.

DIESEL BIOCIDE (RACOR)

A division brand under the prominent filter-maker Parker, Racor markets a biocide that proved as effective against group "B" culture as the Biobor JF. The main difference between it and the Biobor is the active ingredient. Racor uses a thiocyanate that is soluble in water. It also is slightly less expensive than the Biobor. The Racor biocide is an emulsion, soluble in both water and oil.

Bottom line: Like the Biobor, this Recommended product allowed no microbe growth in Culture B, but was ineffective against Culture A.

STANADYNE PERFORMANCE FORMULA/ POWER SERVICE PLUS CETANE BOOST

Curious to see whether they had any effect on biomass, we included these two performance-enhancing products. They make no biocide claims, but they do claim to bring water out of suspension. Stanadyne is a well-known maker of fuel system parts as well as additives. Power Service Plus offers a variety of fuel additives.

Bottom line: Surprisingly, Stanadyne (shown in table) had some effectiveness

against the microbes in the Culture A and none on Culture B. The Power Service Plus formula had no detectable effect on either culture. In the all-or-nothing war against microbes, neither is much help, nor do they claim to be.

STAR BRITE

We tested two Star brite products, Star brite Bio Diesel and Star Tron Diesel. Only the Bio Diesel product contains a pesticide, a thiocarbamate, the same type found in ValvTect Bioguard. Star Tron is supposed to work by dispersing sludge and water, making it easier to filter out contaminants that can promote biological growth. Again, we did not test for this.

The main difference between the ValvTect Bioguard and the Star brite Bio Diesel is that the ValvTect is oil soluble, while the Star brite blend is considered water soluble. Although Star Tron Diesel has no pesticides, it held microbes in Sample A at bay for 24 hours.

Bottom line: The Star brite Biodiesel biocide allowed no growth in Culture A and is a Recommended product. The Star Tron Diesel is not a bug killer, it is a fuel conditioner and dispersant.

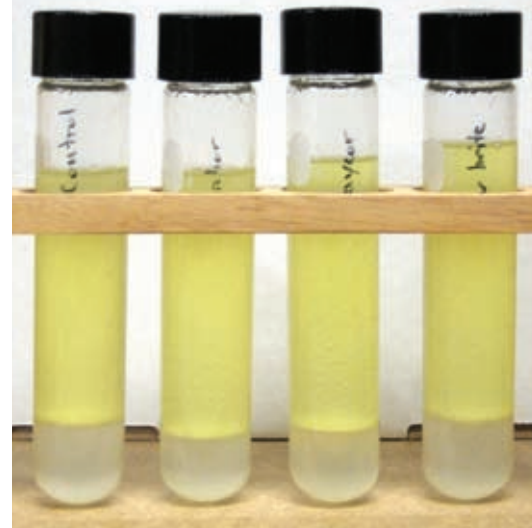
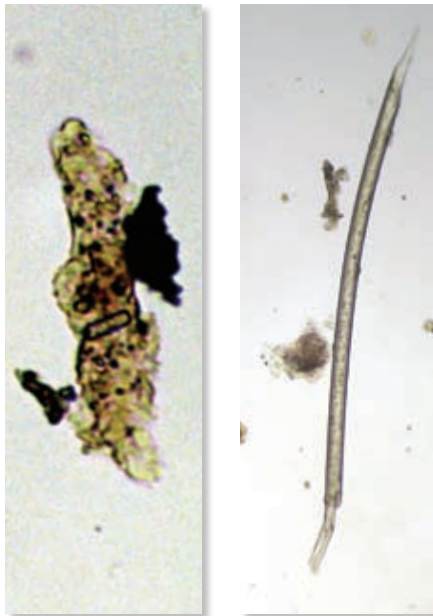
VALVTECT BIOGUARD

ValvTect is a subsidiary of RPM International (also makers of Rust-Oleum) that specializes in fuel additives. It claims to be the nation's leading supplier of fuel additives to the marine industry. Bioguard features an oil-phase additive that includes the water-soluble active pesticide ingredient, di-thiocarbamate. This appears to be the most common pesticide type used in diesel additives on the marine market.

Bottom line: ValvTect is readily available and worked well on our A culture. It is a Recommended product and compares very closely to the Star brite Bio Diesel.

CONCLUSIONS

Like any antibiotic, it seems the cure depends on the sickness. In Culture A, we found that carbamate-based biocide consistently performed very well. Oddly, Star brite Bio Diesel and Stanadyne Performance Formula were more potent in



Under the microscope, bacteria (left) and fungi (right) in fuel are evident. But even a significant colony in our control sample (left-hand test tube, above) is invisible to the naked eye.

Culture A than other registered biocides. Like many home-remedies, it seems they simply had the right stuff for this infection. In Culture B, the borinane and thiocyanate formulations shone, but not the other biocides, and not the general performance additives. So, is the cure for your infection amoxicillin or bacitracin? It depends on the infection.

The most consistent users of these biocides—airports—typically pick a biocide and stay with that one product. However, the results of our testing suggest that changing additives twice a year is a viable defense as well, perhaps more effective. The required maintenance dosage and price of biocides is very low compared to the performance additives. It would be most economical to use a borinane (Biobor) half of the year and a thicarbamate (Star brite Bio Diesel or ValvTect BioGuard) the rest of the year. Any formulation of the same chemistry as these would also get our recommendation.

Because the growth of biomass is dependent on some water accumulation, fuel polishing and the use of water-separating additives (demulsifiers) are expected to be a helpful in prevention. This is not because the equipment and products remove bacteria or kill them: Filtration removes fine particles and makes fuel/water emulsions less stable, and separation additives destabilize emulsions making water removal easier. Emulsions generate enormous surface

area helping to spread bugs. Without water and fuel/water emulsions, the tank becomes a poor environment for microbial growth. Fuel polishing doesn't eliminate bacteria, it reduces susceptibility. The dual-filter fuel polishing/filtration system, Filter Boss (www.filterboss.com) on one of our test boats, works flawlessly, although a DIYer can build a similar system for less. A comparison of similar off-the-shelf fule/polishers is in the works.

For more on tank cleaning and combatting fuel bugs, check out the "Also with this article" box next to the online version of this article at www.practical-sailor.com. And please properly dispose of any treated fuel or water removed from your tank. ▲

CONTACTS

BIO-BOR JF, 800/582-4224, www.hammondscos.com

POWER SERVICE, 800/643-9089 www.powerservice.com

RACOR, 800/344-3286, www.racor.com

STANADYNE, 860/525-0821, www.stanadyne.com

STAR BRITE, 800/327-8583, www.starbrite.com

VALVTECT 800/728-8258, www.valvtect.com

Liquid Wax Test Launch

Practical Sailor evaluates 25 bottled products for initial gloss and water-beading before mounting the test panels for long-term observation.

In the February 2009 issue of *Practical Sailor*, we reviewed paste waxes, those harder compounds normally sold in cans or tubs. In our perennial quest for a glossy boat exterior, we have expanded our tests to include a long list of waxes and polishes now sold in bottles.

In choosing which product is best for your boat, first decide what result you are looking for. A bright showroom shine or long-term protection? What is your location, and how is the boat used? A formula high in carnauba wax may be best for a short-term brilliant shine, but one with a hard polymer or glass-like coat and UV inhibitors may have the best long-term protection.

Even brand new boats need to have the gelcoat sealed and protected from the elements. Start with a good marine sealant and polish, preferably one of the new synthetic polymer-based types. (If oxidation has already started, you will need a rubbing compound, but all this will be covered in a future article.)

In this issue, we are addressing liquid waxes and sealants to use for the final step in obtaining the ultimate hard, glossy finish after the rubbing compound, fillers and polishes have been applied.

WHAT WE TESTED

With an ever-growing number of products on the market, *Practical Sailor* settled on 26 liquid products from 21 manufacturers that were advertised or recommended as boat and car waxes, polishes, or finish applications. We left out some that rated poorly in previous tests.

We intended to test only finish waxes, but several are multi-purpose polishes with cleaning agents. All claim to provide a high gloss or the surface ability to reflect light.

We looked for products that were easy to apply and create that sought-after mirror finish on the sides and decks of our sailboats.

In general, as with the paste waxes, these liquid products are meant to be applied after the compounding and

buffing steps, if needed. These are for the finishing step and are for surfaces that are in good shape.

Some waxes do contain UV-protection agents, but the amount of UV protection that a microscopically thin layer of wax can provide is limited. The primary goal of a wax is to protect the top layers of gelcoat that already contain UV-protection agents. PS tested UVA and UVB absorption among a handful of waxes claiming UV protection and no product, even when applied in a thick film, absorbed a significant percentage of these rays.

In many ways they all look, feel, and smell the same. Their differences may be in the labeling and what market application the manufacturers are seeking.

The Value Guide on page 26 shows a wide range of prices for these products. Car waxes and polishes are available through a variety of automotive and hardware retailers and tend to be less expensive. Some products are sold through marine dealers and distributors such as West Marine, and the newer specialty products are mostly sold direct and online.

HOW WE TESTED

The products were marked, tested, and listed in random order.

Two white fiberglass hatch covers were washed, dried, and prepared by machine buffing with 3M Perfect-It rubbing compound and 3M Finesse-It II Restorer to remove dirt and scratches. A grid was laid out on the covers with masking tape. One coat of each wax or coating was applied to an area about 6 by 8 inches, following maker instructions, and then buffed off by hand.

Testers observed and rated each finish in the sunlight, then sprayed them with a mist of water and rated the relative beading. In a dark room, testers held a multi-bulb LED flashlight over each polished square. The degree of clarity of the reflected LEDs in each determined the finish's degree of gloss; testers rated them accordingly.

For this test, there were no significant differences in the ease of application from one product to the next. All were easy to apply and easy to buff off, so we left that factor out of the Value Guide on page 26.

Post application, testers mounted the hatch



Practical Sailor tested more than two dozen liquid boat wax-polishes from 20 manufacturers. Most are designed as last-step products in the wax-polish-buff routine.

MAINTENANCE

Two fiberglass hatch covers served as the liquid-wax test platform. Testers applied each wax to a sectioned-off portion and sprayed them with fresh water to evaluate beading action.

covers face-up in an unobstructed spot on the roof of our workshop in Sarasota, Fla., basking in the hot sun, wind, and summer rains. We'll check in on the hatches regularly and will publish updates on the products' long-term performances.

WHAT WE FOUND

Star brite Premium Marine Polish No. 85716:

This Star brite polish boasts PTFE (Polytetrafluoroethylene), the company's registered formula it claims produces an extremely slick, UV-protected, non-stick and durable finish. Not a cleaner, Premium Marine Polish can be applied over old wax and polish. The thick, white liquid produced a nice shine and was best on the water-beading test.

Star brite Marine Polish, No. 80116: This is a thick, blue liquid multipurpose cleaner/polish. It is designed to remove light chalking from gelcoat and aluminum and to restore luster. It contains kerosene, has a very strong kerosene smell, and did well on the water-beading test.

Cajun Shine All: The kit comes with two polishing cloths made of a unique ultra-microfiber. The instructions are very specific that these cloths must be used, one to apply and one to buff. Cajun is a very thin water-based, eco-friendly product with no petroleum distillates. It is designed as a one-step cleaner and detailer and rated average for shine.

Collinite No. 870: Shake the Special Heavy-duty Fleetwax well as the white liquid can separate over time. This has a definite cleaning action, is easily applied, and leaves a hard protective wax coating and a good shine.

Collinite No. 845: The Insulator Wax formula is now also sold as Collinite No. 925 Fiberglass Boat Wax. This thick goo has a good reputation, produced a great shine, and rated highly in the initial water-beading test. Historically, it's been a top-rated product.

3M Scotchgard No. 09061: Marine Liquid Wax is a thick white liquid. Initial results showed it to be a Fair performer.

Mothers No. 91556: Marine Synthetic Wax, a very thick white liquid, seemed to lay on in a thick coating. It produced an average shine.

Re-Structure Professional Marine Polish. A thick tan goo, this is one of the newer, non-wax,

nanotechnology polishes designed to seal the pores in gelcoat and paint, leaving a hard, high-gloss, glass-like finish. It produced a high-gloss shine, but did not bead water well. Since our test was launched, Re-Structure has reformulated its product, adding more UV inhibitors. Look for a report on the new product in a test update.

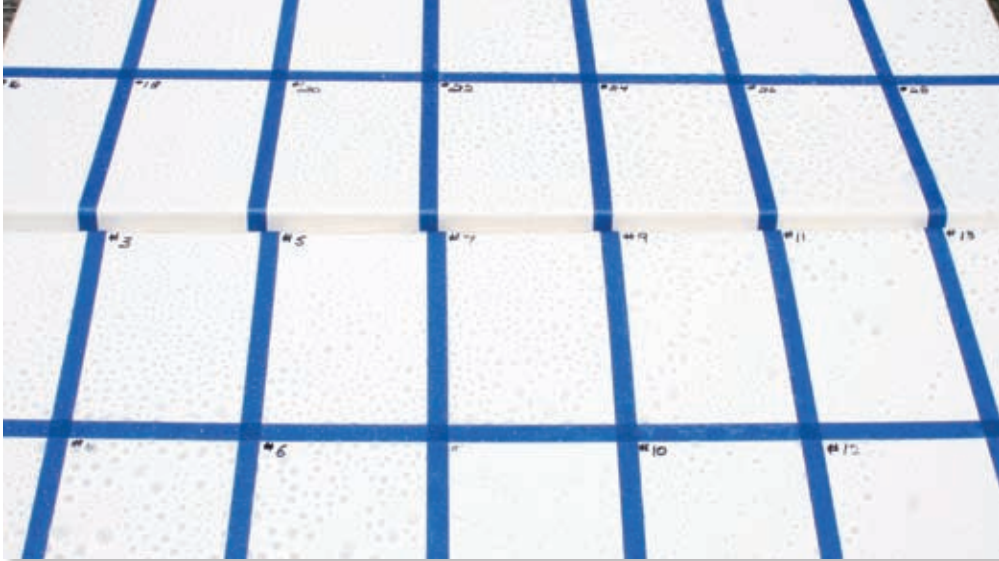
Interlux Premium Teflon Marine Wax: This is a semi-thick, white liquid cleaner/wax that leaves a slick Teflon coating. Its initial gloss and beading was average.

Interlux UV Protectant & Teflon Wax Sealer: This is a very thin, almost clear liquid with a strong smell that goes on easily and dries quickly. Its shine was average, but if it truly seals and provides good sunscreen, it would be easy to apply every few months since it does not require buffing. Our long-term test will help determine this.

Nu Finish: "The Once a Year Car Polish" is a white liquid is relatively easy to apply and buff off. It gives a fairly good shine for a reasonable price and for reasonably long time, according to past tests. It also touts a money-back guarantee.

Rejex Soil Barrier & Anti-Stain Protectant: A true final coat product, Rejex is an advanced polymer treatment designed to provide an impervious ultra-slick coating to seal and protect gelcoat, paint, Plexiglass, and other surfaces. It does not contain any silicones, oils, or waxes. Application directions require it to cure for 12 hours before use. They recommend washing and re-applying in four to six months. It is a good sealant, but it did not bead water as well as others in our test.

Imar No. 402: Yacht Polish cleans, shines, and



PS VALUE GUIDE LIQUID POLISHES

MAKER	PRODUCT	PRICE/ PRICE SOURCE	SIZE/ COST PER OZ.	CLAIMS UV INHIBITORS	INITIAL GLOSS
STAR BRITE	Premium Marine Polish No. 85716 ★	\$28.99 / westmarine.com	16 oz. / \$1.81	Yes	Excellent
STAR BRITE	Marine Polish # 80116 ★	\$19.99 / westmarine.com	12 oz. / \$1.67	No	Excellent
CAJUN	Shine All	\$17.95 / cajunshine.com	16 oz. / \$1.12	No	Good
COLLINITE	No. 870 Heavy-duty Fleetwax	\$28.99 / westmarine.com	16 oz. / \$1.81	Yes	Very good
COLLINITE	No. 845 Insulator Wax (No. 925) ✓	\$25.99 / westmarine.com	16 oz. / \$1.62	Yes	Very good
3M	Scotchgard Marine Liquid Wax	\$34.99 / westmarine.com	16.9 oz. / \$2.07	Yes	Good
MOTHERS	Marine Synthetic Wax	\$15.99 / basspro.com	16 oz. / \$1	No	Good
RE-STRUCTURE	Professional Marine Polish	\$29.95 / re-structuremarine.com	12 oz. / \$2.50	No	Fair
INTERLUX	Premium Teflon Marine Wax	\$28.99 / westmarine.com	16.9 oz. / \$1.72	Yes	Good
INTERLUX	UV Protectant & Marine Wax Sealer	\$12.30 /jamestowndistributors.com	16.9 oz. / 73c	Yes	Fair
NU-FINISH	The Once a Year Car Polish	\$9.99 / acehardware.com	16 oz. / 62c	No	Very good
REJEX	Anti-Stain Protection	\$19.95 /corrosionx.com	16 oz. / \$1.25	No	Fair
IMAR	Yacht Polish No. 402	\$22.99 / westmarine.com	16 oz. / \$1.44	Yes	Fair
FLITZ WAXX	Super Gloss Protectant	\$14.38 / dtepp.com	7.6 oz. / \$1.89	Yes	Good
YACHT BRITE	Pro Polish	\$15.99 / overtons.com	16 oz. / 99c	Yes	Good
WOODY WAX	Carnauba Glass Coat	\$26.79 /defender.com	16 oz. / \$1.67	No	Good
RAYMARINE	Marine Shield	\$29.99 / Raymarine	22 oz. / \$1.36	Yes	Good
MEGUIAR'S	No. 56 Pure Carnauba Wax ✓	\$15.99 / westmarine.com	16 oz. / \$1	No	Excellent
MEGUIAR'S	Flagship Premium Marine Wax ✓	\$19.99 / westmarine.com	16 oz. / \$1.25	Yes	Excellent
GLARE	Professional Polish	\$34.95 / glare.com	12 oz. / \$2.91	Yes	Good
GLARE	Micro Finish & Professional Polish	\$69.90 / glare.com	12 oz. / \$5.83	Yes	Good
WEST MARINE	Pure Oceans with PTFE	\$19.99 / westmarine.com	16 oz. / \$1.25	No	Good
TURTLE WAX	F-21 \$	\$9.99 / acehardware.com	20 oz. / 50c	Yes	Excellent
ISLAND GIRL	Mirror Hard Superglaze ✓	\$63.95 / Island Girl	12 oz. / \$5.32	Yes	Excellent
PRISM POLISH	Mirage	\$19.99 / prismpolish.com	16 oz. / \$1.25	Yes	Good
ZAINO BROS.	Z-3 Show Car Polish ✓	\$14.95 / zainostore.com	8 oz. / \$1.87	Yes	Very good

★ Best Choice ✓ Recommended \$ Budget Buy

protects gelcoat. It is a blend of polymers that will remove light oxidation without abrasives, provide a UV sunscreen, create a protective barrier, and leaves a reasonable shine. This liquid did well in vinyl tests (*PS*, March 2009) but did not bead water in this one.

Flitz Waxx: Super Gloss Wax Protectant is another water-based, eco-friendly, multipurpose wax that contains no

silicones but includes a UV protectant and is a white carnauba and natural beeswax formula. It comes with a pump applicator, and is easy to apply and easy to remove without any residue. It produced a nice shine.

Yacht Brite Pro Polish: Fiberglass Seal & Polish is a very thick white goop. It is one of the newer polymer-based products that produce a hard coating, UV

protection, and a high-gloss shine. It goes on quickly, buffs out easily, and beads water nicely.

Woody Wax: Carnauba Glass Coat, which comes with a spray nozzle, is a very thin liquid that easily separates and must be shaken well. The maker suggests multiple applications for best results. It has a strong petroleum smell; be careful of overspray or getting it in

your eyes on a windy day. Woody Wax suggests users repeat spray and buff “as necessary,” and claims three coats will last six months. It rated well in our water-beading test.

Marine Shield: This fairly new petroleum distillates finishing formula is a light-blue liquid that can be applied in direct sunlight and is designed to provide a defensive shield against the harmful effects of salt water, rain, and UV rays. It produced a fairly good high-gloss shine in our test.

Meguiar’s No. 56: Marine/RV Pure Carnauba & Polymer Blend is a yellow, moderately thick liquid that has the familiar sweet scent of carnauba wax. Like many of the waxes, it rated high on the initial water-beading test.

Meguiar’s Flagship: Premium Marine Wax is a cream-colored liquid wax that has done well in past tests and did a nice job of beading water in this test.

Glare Professional Polish: Another fairly new product, Glare is not a wax, has no polymers or resins, but has the ability to prepare, polish, seal, protect, and shine paint, fiberglass, and gelcoat finishes. The company calls the formula “Glassplexin.” It includes silicates, which flow like liquid glass to seal pores and leave an ultra-hard, glass-like coating. *Practical Sailor* tested this by itself and with the maker-recommended Glare Micro Finish formula preparation, which contains fine abrasives to remove oxidation and small scratches. The combined result looks good.

West Marine Pure Oceans: This nanotech fiberglass polish with PTFE is an eco-friendly, natural citrus formula, with no petroleum distillates. It produced an average shine in our test.

TurtleWax No. 21: Another nanotech formula car polish, No. 21 also has a UV protectant and urethane enrichment for long-lasting hardness. As with the Turtle Wax paste wax, No. 21 produced a good gloss and beaded water well. It also was the most economical of the liquids.

Island Girl: Testers applied the Mirror Hard Superglaze, following the instructions on the 12-ounce bottle. We opted to not use the supplied drying catalyst as it was a hot day and our test panel was clean, dry, and in good shape. The

clear, oily liquid was applied with a paper towel, leaving a thin coating. After a half-hour, this was wiped with a clean micro-fiber cloth to remove any excess film and allowed to cure for another hour. Wiping it again with a cloth produced a high-gloss shine. Spraying with fresh water produced exceptional water beading. The instructions claim that after a day or two, the finish cures even more to a hard mirror finish. It can be used on gelcoat, plastic, chrome, stainless, paint, and varnish

Prism Polish: Made in the USA, Mirage Sealant and Protectant is a wax-free cleaner, polish, and sealant. It uses polymers to create a hard coat for protection from UV and acid rain. Using a clean damp cloth, we rubbed in the creamy liquid. It was allowed to dry to a haze for about 30 minutes and was buffed out to a nice shine with average water beading.

Zaino Bros.: Created for show cars, Z-3 Car Polish can be layered for added protection. The synthetic formula also contains a blend of emulsifiers and a UV-40 sun protectant. Its gloss and water-beading were very good.

CONCLUSIONS

Most of the two-dozen products in this test did a good job of producing a nice shine. In our initial testing, the difference in gloss, water beading, and reflection was minimal, making it difficult to tap any real winners or losers in this initial report. The reflection test was virtually a 26-way tie.

However, it was obvious that the best finishes for initial water beading were those with a slightly oily wax formula. Both Star brite polishes beaded water best, followed by Island Girl and Zaino Bros.’ Z-3, Collinite No. 845/925, and both Meguiar’s carnauba waxes. The Turtle Wax No. 21 was our choice for Budget Buy.

Water beading and initial gloss are not a definitive test to determine the best protective coating. Stay tuned for follow-up reports on protection longevity.

For more on gelcoat care, check out “Offshore Log: Gelcoat Maintenance” and at www.practical-sailor.com, in the “Tools & Techniques” section. ▲

CONTACTS

STAR BRITE, 800/327-8583
www.starbrite.com

CAJUN, 800/853-2880
www.cajunshine.com

COLLINITE, 315/732-2282
www.collinite.com

3M, 877/366-2746
www.3m.com

MOTHERS
714/891-3364
www.mothers.com

RE-STRUCTURE
310/639-7069
www.re-structuremarine.com

INTERLUX
908/686-1300
www.yachtpaint.com

NU FINISH
800/484-9560
www.nufinish.com

REJEX, 800/638-7361
www.corrosionx.com

IMAR, 703/330-4693
www.imarsales.com

FLITZ, 800/558-8611
www.flitz.com

YACHTBRITE
772/287-1313
www.shurhold.com

WOODYWAX
800/619-4363
www.woody-wax.com

MARINE SHIELD
603/881-5200
www.marineshieldproducts.com

MEGUIAR’S INC.
800/347-5700
www.meguiars.com

WEST MARINE
800/685-4838
www.westmarine.com

TURTLE WAX
800/887-8539
www.turtlewax.com

GLARE, 866/374-5273
www.glare.com

ISLAND GIRL PRODUCTS
800/441-4425
www.islandgirlproducts.com

PRISM POLISH
877/377-5112
www.prismpolish.com

ZAINO BROS.
732/833-8800,
www.zainostore.com



The 10 test paste waxes were applied to a fiberglass panel and left out in the Florida sun and rain for six months. From left, top row: Kit, Meguiar's Premium, Turtle Wax Super Hard Shell, Collinite No. 885, and Star brite Boat Wax. Bottom row: Nu-Finish, Star brite Marine Polish with PTFE, Turtle Wax F21, 3M Marine Ultra Performance, and Mother's Carnauba Cleaner Wax.

Collinite is Still Tops

No. 885 stands out for durability in paste wax test field.

How long do they last? In the February 2009 issue of *Practical Sailor*, we reviewed a sampling of 10 paste waxes that were available in the old-style metal cans or newer plastic tubs. The waxes and polishes were applied to taped-off sections of a 3-foot by 5-foot fiberglass hatch and rated for ease of application as well as gloss and water beading. After six months, two products clearly stood out for their continued ability to bead water and repel dirt.

The Collinite No. 885 Fleetwax, which was a PS top-rated product in 2004, again

retained the best gloss and water beading in this followup. It is one of the heavier waxes, takes some rubbing to get on, and requires some serious buffing to get off.

Another repeat champion, the 3M Marine Ultra Performance Paste Wax, came in a close second. It is one of the harder waxes, but goes on and comes off easily. Third place in the water beading was the Meguiar's Flagship, one of the easiest to apply. We're also testing this on a hull on Chesapeake Bay, where it is neck and neck with Collinite No. 885.

In a tie for fourth in the water beading is Mother's Cleaner Wax and Nu-Finish

Paste. Among the automotive products, the Turtle Wax F21 and Kit waxes stood out. (We are retesting Star brite Marine Polish and Star brite Boat Wax, as the stock purchased for this test was lumpy and aged.)

Although the waxes rated Good beaded some water, they're nearing re-application time. The Fair products also beaded water, but surely needed re-application.

You can extend your fiberglass protection by applying multiple coats, which would make ease of application more important if you plan on two or three applications a season. Manufacturers are moving to softer, more high-tech formulas that are less labor intensive. We evaluated some of these in the liquid waxes test on pages 24-27. ▲

PS VALUE GUIDE		PASTE WAXES AT 6 MONTHS					
MAKER	PRODUCT	PRICE/PRICE SOURCE	SIZE/COST PER OZ.	TEXTURE	APPLICATION	INITIAL GLOSS	6-MONTH WATER BEAD
3M	Marine Ultra Performance Paste ✓	\$25/sportsauthority.com	9.5 oz./ \$2.95	Hard wax	Good	Excellent	Excellent
COLLINITE	No. 885 Fleetwax ★	\$29/westmarine.com	12 oz./ \$2.42	Hard wax	Fair	Excellent	Excellent
KIT	Carnauba Car Wax	\$6/acehardware.com	12 oz./ 50¢	Runny, soft	Fair	Fair	Good
MEGUIAR'S	Flagship Premium Marine Paste Wax ✓	\$17/defender.com	11 oz./ \$1.54	Medium soft	Excellent	Good	Good
MOTHERS	California Gold Carnauba Cleaner-Wax ✓	\$12/napaonline.com	12 oz./ \$1.08	Hard wax	Good	Good	Good
NU-FINISH	Soft Paste \$	\$8/autozone.com	14 oz./ 57¢	Very soft	Fair	Fair	Good
STAR BRITE	Premium Marine Polish	\$18/basspro.com	14 oz./ \$1.36	Very soft	Fair	Fair	Fair
	Presoftened Boat Wax	\$15/defender.com	14 oz./ \$1.11	Very soft	Fair	Poor	Fair
TURTLE WAX	Super Hard Shell Wax	\$6/advanceautoparts.com	14 oz. / 39¢	Runny, soft	Fair	Fair	Fair
	F21 Car Polish	\$8/acehardware.com	14 oz./ 64¢	Medium soft	Excellent	Good	Good

★ Best Choice ✓ Recommended \$ Budget Buy

For the She-sailors

These reads cover everything from engine repair to Downward Dog and raising kids afloat.

Sailing how-to and have-done books abound. But only in the last decade or so has the world of sailing literature taken an interest in women-specific resources and travel stories. Grateful to have our very own how-tos and have-dones that extend beyond the galley, the women of *PS* picked up some new reads for summer. From tips on relationships aboard to tales of a White House aide turned cruiser, these books have much to offer the reader, be she the captain or the mate.

YOGA ONBOARD

In “Yoga Onboard, a guide for cruisers and live-aboards,” author Kim Hess demonstrates how to tweak your yoga practice to accommodate the confines of life aboard. In addition to showing you how to fit your Downward Dog into the cockpit, the book features instructional photos of Hatha yoga poses astern, amidships, and on the bow, along with instructions on postures. Yoga is about grounding, balancing, and using energy with a focus, so it’s only fitting that it is connected with sailing in this informative, well-organized book, which is also available on DVD (www.yogaonboard.com). (*Blue Duck Enterprises, 2007, \$23*)

IT'S YOUR BOAT TOO

Former U.S. Navy commander Suzanne Giesemann’s “It’s Your Boat Too, A Woman’s Guide to Greater Enjoyment on the Water, for Power or Sail” provides a wide range of excellent knowledge that answers beginner cruiser questions and details some of the (less) finer points of sailing—engine maintenance, electronics, safety, etc.

Most importantly, where many of the sailing books marketed toward woman discuss provisioning and galley duties, Giesemann’s book tells you how to sail! It is an empowering book that could help a reader become a better sailor and have more fun doing it.

With a foreword by Lin Pardey, the book also includes terminology, Rules of the Road, line handling, navigation, docking and anchoring, and boat systems. We highly recommend women cruisers add this to their library. (*Paradise Cay Publications, 2006, \$10*)

THE CRUISING WOMAN'S ADVISOR

Diana Jessie’s “The Cruising Woman’s Advisor, How to Prepare for the Voyaging Life” answers many questions that beginners may have about the cruising lifestyle. Jessie tells readers how to compile cruising knowledge without going into the how-tos of sailing and seamanship. With forewords

by Tania Aebi and Lin Pardey, the book covers the minutiae of live-aboard life, including roles and relationships afloat, staying in touch, provisioning, and female-specific hygiene tips. Readers looking for more on sailing and boat systems should also pick up Geisemann’s book. (*McGraw-Hill Co./International Marine, 2007, \$13*)

MARY'S VOYAGE

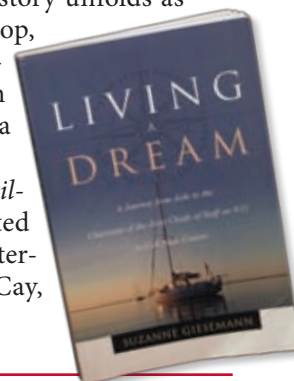
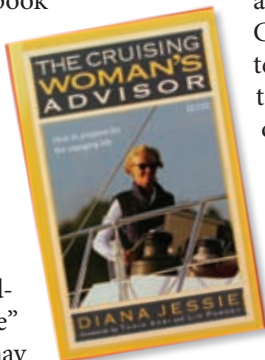
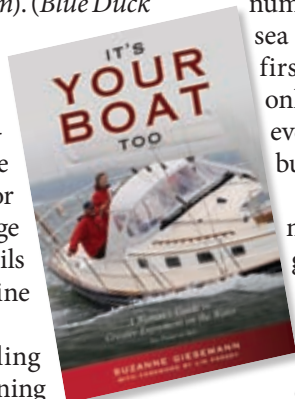
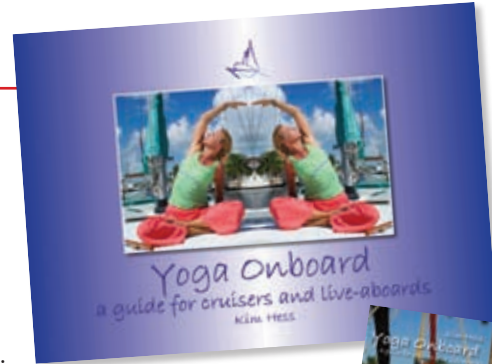
Readers of John Caldwell’s gripping “Desperate Voyage” (1949) will already be familiar with his wife, Mary Caldwell. “Mary’s Voyage, the Adventures of John and Mary Caldwell” picks up where John’s book left off. John’s story was a harrowing tale of a man lost at sea trying to get back to the woman he loved, but Mary’s biography is of a woman trying to raise a family (including two young sons, a husband, and numerous pets, among them a goat) at sea as they attempted to become the first family to circumnavigate using only a sextant and dead reckoning. The family’s exploits eventually landed them in the Caribbean, where they built the idyllic resort known as Palm Island.

Mary’s experiences tell of a remarkable wife, mother, and captain. Her insights offer a candid glimpse of cruising’s great challenges and unmatched rewards. Readers, no doubt, will be inspired to toss off the docklines and head for less crowded waters after enjoying this engaging story. (*Sheridan House, 2008, \$20*)

LIVING A DREAM

Sailing how-to author Geisemann tells her own story in “Living a Dream, a Journey from Aide to the Chairman of the Joint Chiefs of Staff on 9/11 to Full-time Cruiser.” The well-written page-turner chronicles Geisemann and her husband’s transition from hectic professional lives in the Navy to their dream life as cruisers. Geisemann’s story unfolds as the two move aboard their 36-foot sloop, *Liberty*, and head for distant anchorages. She takes the reader through foul weather and an emergency at sea to icy fjords and warm islands.

A contributor to *Blue Water Sailing* magazine, Geisemann is a gifted storyteller whose biography is both entertaining and encouraging. (*Paradise Cay, 2008, \$12*) ▲





The Winchmate system offers two types of line-grabbing jaws: fixed and spring loaded. Testers gave high marks to both after a year in the field.

nance makes the changeover quite simple and straightforward. The process can be “e-assisted” with Winchmate’s step-by-step online installation video.

With the drum removed and bearings, gears, and pawls cleaned, greased and reassembled, a spindle extender is threaded to the top of the winch spindle. A Delrin spindle extension bushing is added, and attention is then turned to the drum itself.

The system designer has come up with two types of line-grabbing jaws, either a fixed version or a spring-lock option, and we have tested both. These systems mate like hand and glove to the top of the existing drum and are held in place by a clever counter-clockwise threaded lip and capture ring that is hand-tightened in place. The feed jaw is positioned with a winch handle drive extension, and all is held in place by a chrome drum nut tightened with a simple two-point spanner wrench.

Continued on page 31

Photo by Ralph Naranjo

Winch Makeover

Winchmate makes self-tailers of old deck gear.

The Winchmate is one answer for sailors who are considering upgrading to self-tailing winches but find the price tag too intimidating and have otherwise perfectly functional non-self-tailing winches that are too good to toss out. Now there’s another option: Older Bari-ent or Barlow winches can be retrofitted

with a carefully machined upper drum assembly that adds a rugged and reliable self-tailing feature.

To test the concept, we retrofitted a set of near museum-aged Barlow two-speed 28s with the easy-to-install Winchmate system. Combining the upgrade with normal annual cleaning and mainte-

Synergy Dock Line Stands Up in Tests

Polyester braid with an integral snubber conveniently absorbs shock.



The Synergy lines (being marked for measurement here) began stretching at loads less than 10 pounds and did not deform under loads of 900 pounds.

In July 2008, *Practical Sailor* looked at products for docking, anchoring, or mooring in a storm. Among those mentioned was the Synergy docking line, an abrasion-resistant polyester braid with a short length of industrial-grade rubber in the core. Synergy also makes a stretchy, floating tow-rope for dinghies.

We put Synergy dock lines into use for six months on a fixed dock and during a two-week Mississippi River delivery cruise. They held up as well as similar braided lines and proved to be more convenient to use than its nearest comparison, a dock line with a rubber snubber. One drawback noted was that the woven cover was more prone to snagging than more tightly braided lines.

In controlled tests, *PS* applied a 900-pound load to a 10-foot long, half-inch

Synergy line (\$42.50) and observed about 15 inches of stretch. The line, which has a 9-inch length of rubber in the core, began visibly stretching at loads of about 10 pounds but returned to its original length once the load was released.

We will add the line to an upcoming line-abrasion test. For now, our preferred choice for most docking and mooring duties is good quality, three-strand nylon with chafe gear, a tough team to beat. Check out our used rope endurance test at www.practical-sailor.com/marine/used-nylon-rope-endurance-test.html. ▲

CONTACT

SYNERGY MARINE, 514/867-4493,
www.synergymarine.com

Practical Sailor Back Articles: Don't Miss The Boat!

Order your back articles in two convenient ways.

Log on to www.practical-sailor.com/backissues and immediately download your article to your computer or mail the order form below.

Continued from page 30

Be very careful not to cross thread either the spindle extension or the drum nut during the installation. Each of these components should initially turn with only finger pressure. If either starts to bind before any surfaces mate, unthread, and re-try, taking care to match the threads with as parallel a start as possible. During the drum and line stripper installation, a provided spacer may be needed to allow adequate clearance.

FIELD TEST

With the Winchmate set up on the primary Barlow 28s aboard *PS* Technical Editor Ralph Naranjo's Ericson 41, *Wind Shadow*, we tested the operational advantages of the self-tailing gear. Using the winches for genoa trimming and spinnaker sheet and guy hauling, we found the system to be as user-friendly as any standalone self-tailers on the market today. Over the year that we have been testing both the fixed and spring-loaded products, we have not had to make any modifications to the installation.

We initially protected the exposed aluminum threads with CRC corrosion block spray; after a year, there are no signs of deterioration. The anodizing is holding up well. Of the two line-locking systems we installed, we found that the spring jaw definitely provides a more aggressive hold, but the fixed jaw, with its wedge type line fit, is so easy and convenient to release that we are hard-pressed to favor one over the other. Both get high marks from testers.

In the final tally, we looked at the list prices per Winchmate unit—\$549 for fixed and \$599 for spring jaw—and compared them to the \$2,000 average cost of replacing the Barlow and Barient 28s (plus installation). It seems fair to say that for those with well-maintained Barient and Barlow winches (size 27-32), a 25-percent to 30-percent self-tailer retrofit is worth the investment. ▲

CONTACT

WINCHMATE
415/460-5151
www.winchmate.com

□ **JUNE 2009:** Refrigeration Conversion Kits; Handheld GPS Update; Raymarine A50D; Tillerpilots Field Test; Rope Clutches Update; Heavy-weather Sails for Furling; PS Advisor: Fouling fix for the waterline

□ **MAY 2009:** Exterior Wood Finish Six-month Checkup; Practically Green: Belowdecks; Ratchet Blocks Test; Wind Gen Field Test; Handsfree Onboard Communication; Ocean Tested: Tethers; Chandlery: Inflatable Hobie i12s; PS Advisor: Boat buying in a down market

□ **APRIL 2009:** Affordable Dream Boats; Entry-level Fixed and Handheld VHF's; Digital Thermostat for Galley Fridges; Nesting Cookware Test; Rust Busters; Chandlery: Flow-Rite Pro Fill, Big Kahuna shower, Fresh Flush Gas Watch, Fender Cleat, Chafe-Pro, Wrino Hook, Leatherman LEDs, Great Neck tools, Bionic Wrench; PS Advisor: Group Calls on DSC-capable VHF's

□ **MARCH 2009:** Maintenance Special: Bottom Paint 2009, Vinyl Window Restorers, Stripping Barrier Coats; Rope Clutch Test; 9.9 Outboard Shootout; Chandlery: Dry Suits; PS Advisor: Sail Shape

□ **FEBRUARY 2009:** Heavy-weather Sailing: Drogues sea trialed; Boat Design: Comfort vs. Speed; Mid-priced Fixed VHF's; Paste waxes; Alado Jib Furler; Chandlery: Firts-aid products; PS Advisor: Sea anchor sizing

□ **JANUARY 2009:** Boat Review: Trophy Daysailers; Interior LEDs test; SMile Wi-Fi Test Run; Seasick Medications; Small Stoves Update: CookMate; Mildew Stain Removers; Chandlery: Book Reviews; PS Advisor: Water-logged Rudder

□ **DECEMBER 2008:** Gear of the Year; New Handheld GPS Units; Medical Kits: Bluewater Crusiers; Skip Allan's Farewell to Wildflower; Heavyweight Anchors Test; Ocean Tested: Honda genset, EarthNC software; PS Advisor: Wood finish for cabin sole

□ **NOVEMBER 2008:** Boat Review: e-33; Ethanol Additives Test; Raymarine AIS250 Review; Emergency Tillers of the Day; Cold-weather Gloves Test; Heavyweight Anchors by Manson and Rocna Test; Chandlery: UK Water-tight Box, Boye Basic 3 Cobalt Knife, Redi-Edge Sharpener; PS Advisor: Antifouling for Inflatables

□ **OCTOBER 2008:** Bottom Paint Test; Folding-transom Rigid Inflatable Boats test; 5-inch Plotter-sounders Test; Ocean Tested: Wet-cell Batteries; Teak Caulk Test; Trends in Windlasses; Chandlery: Original Nantucket Diddy Bag, Wera Tools; PS Advisor: Search for a DC-DC Converter

□ **SEPTEMBER 2008:** Electric Propulsion; Medical Kits III: Offshore kits; Performance Sailing Gloves; SPOT satellite personal messenger; Acrylic Coatings for Fiberglass (Gelcoat restorers); Large Ice Chest Test; Chandlery: SteriPEN; PS Advisor: Marine plywood vs. regular plywood

□ **AUGUST 2008:** Navy 44 MkII; Inflatable PFDs with Harnesses; Garmin vs. Raymarine chartplotter head-to-head; Topside Paints Test; Catalina 22 refit report; Storm Trysails; Snatch Blocks Update: Ronstan Blocks; Chandlery: Boatsense boat alarm; PS Advisor: Painting Your Deck

□ **JULY 2008:** 10-foot Rigid Inflatable Dinghy Shootout; Safety and Electronics for the Singlehander; Standard Horizon CPV550 review; Foul-weather Gear for Women; Inflatable Fenders; Mooring Chain Test Finale; Chandlery: Summer reading list, Walker Bay Airis inflatable kayak, Crocs kneepads; PS Advisor: Troubleshooting AC units

□ **JUNE 2008:** Singlehanded Sailing Part 1; New Inflatable PFDs without Harnesses; Flir Thermal-imaging Camera Review; Aftermarket Bowsprit Kits; Baseball-cap Style Hat Test; Medical Kits for Coastal Cruisers; 12-volt Inflators; Chandlery: Natrapel bug spray, Freezer Safe fridge thermometer, West System G-Flex epoxy kit, power tools for restoring gelcoat

□ **MAY 2008:** Weta multihull; Practically Green: 'Green' Maintenance products for boaters; Aussie Barbecue Grills; MOB alarms and direction-finding devices; Internal Holding Tank Sensors; Collimate vs. Meguiar's topsides wax; Headlamp Test; Chandlery: Norcross Hawkkey handheld depth sounder

□ **APRIL 2008:** Beneteau 46; Forward-looking Sonar; Medical Kits for Small Boat Sailors; Updating Digital Charts; Exterior Wood Coatings Test: Teak Oils; 12-volt Cabin Fans; Paint Stripper Redux; Chandlery: Whirley Bird, FiveFingers, Steer-IT tiller tool

□ **MARCH 2008:** Etap 28s; Furlers for Light-air Sails; Walker Bay Tubes on Rigid Dinghy; Bi-annual Bottom Paint Test; Teak Cleaners Test; Inflatable Boat Cleaners; Chandlery: Rydlyme vs. MaryKate On&Off

□ **FEBRUARY 2008:** 30-foot Classics Under \$20,000 (Tartan 30, Pearson 30, Catalina 30); Mainsail Handling Systems; Men's Foul Weather Gear Test; Holding Tank Gauges; Hand-bearing Compasses; 'Master and Commander' Review; Chandlery: A METS Recap

□ **JANUARY 2008:** Shannon 37 and 38; Special Report: Navigation Basics; Anchor Test Update; Raritan vs. Jabson marine heads; VHF External Speakers; Trailer Jacks Test; Navigation Software; Chandlery: Xantrex battery products

□ **DECEMBER 2007:** Gear of the Year 2007; Exterior Wood Coatings: Two-part varnishes; Flashlight Test; Special Report: Nylon Lines; Riding Sails; Winter Reads; Walker Bay Genesis Review; Chandlery: Port-o-Flush, boat show update, and Slam Waterproof Laptop Pack

□ **NOVEMBER 2007:** Hanse 400; Remote VHF Mics; Torquedo Electric Outboard Review; Radar-reflective Tape Myth Buster; Hull Cleaners Test; Power Tools for Cruising; Bottom Paint and Wax Field Test Results; Chandlery: Multitools, LED lights, Dax OneTouch winch handle, and Bridgenorth Bailer

□ **OCTOBER 2007:** TomCat 9.7; Semi-annual Bottom Paint test; Cheap Charting Software; Exterior Wood Coatings: Synthetics and Stains; Special Report: Core Materials; Flexible Water Tanks; Chandlery: Velocitek and Cruising Solutions headset

□ **SEPTEMBER 2007:** Sydney 36CR; Outboard Brackets Test; Cruising Software: Offshore Essentials; High-tech Rigging Review; Standard Horizon CPV350 Evaluation; Dock Cart Test; Anti-corrosion Sprays; Chandlery: Solar Stik solar panel and mounts

Please send the back issues checked above to:

NAME (PLEASE PRINT) _____

ADDRESS _____

CITY / STATE / ZIP _____

_____ Back Issues @ \$7.50 ea. _____

Postage & Handling _____ \$2.50 _____

Total Amount Enclosed \$ _____

Please mail this form to:

Practical Sailor
P.O. Box 5656
Norwalk, CT 06856-5656

Practical Sailor™

Synthetics for Marine Diesels?

Extended-life oils offer little to no benefit for most.

I recently read that synthetic oils, such as Mobil 1 have been approved for diesel engines. Do you have anyone with knowledge or opinion about their use in marine diesels? I have used Mobil 1 10-30 in my BMW D-50 diesel for the past nine years, and it seems to have worked out well, including during four trans-Atlantic crossings. We still have good compression and do not smoke or burn oil. Also, it is readily available in the Med.

Lloyd Hamilton
River Gull, S&S/Lyman Morse-built
Sequin 46 sloop
Grand View-on-Hudson, N.Y.



PS ADVISOR

Mobil 1 extended performance oils for automobiles are advertised as providing engine protection and performance at extended intervals of up to 15,000 miles or one year, whichever comes first. Its 5W-40 Turbo Diesel Truck oil meets American Petroleum Institute (API) standards for diesel truck lubrication, and except for the price (\$5-\$8 per quart, or three times the price of conventional multi-grade oil), would seem to be an attractive option for ocean voyagers who might otherwise have to carry out an oil change at sea. However, the official party line at Mobil 1, as we expected, is that you should defer to your manufacturer's recommendation on oil type, weight, and service ratings appropriate for your engine. Typically, if an engine maker does certify the use of a high-mileage oil, it is in combination with routine sampling of the oil to determine its condition.

Unfortunately, ye ol' BMW diesel D-50 has been out of production for many years now, so there would be no mention of Mobil 1 or sampling regimens in your manual, if you could track one down.

While Mobil 1 produces synthetic oils for diesel engines, makers of small marine diesels specify conventional API-rated oils.



ON THE HORIZON
BOOTS
GRIPPER KNOTS
BIRD DETERRENTS
MODERN RACE BOATS
CAM CLEATS

We did, however, have an informative discussion with Steve McGovern, vice president at Mack Boring and Parts Co., and Doug Rose of Volvo on the topic of oils. (Yanmar is currently involved in a joint project with BMW to produce marine engines in the 150- to 260-horsepower range that can use Mobil 1. Volvo sells a synthetic diesel engine oil.)

Both experts agreed that the owner of a typical sailboat auxiliary of less than 100 horsepower and logging 50 to 100 engine hours between seasonal oil changes probably wouldn't get any added benefit from an extended-life oil since manufacturers' specs call for changing the oil long before the "extended life" benefit of a synthetic kicked in.

"Synthetic oils get contaminated with acids, water, soot, etc., just like regular oils, and just because the oil is synthetic doesn't mean that the oil change intervals go out the window," said Rose. "The use of a synthetic oil does not extend the oil change interval without oil sampling."

It is much easier, McGovern said, to justify the expense for synthetics in the trucking or shipping industry where the mileage numbers are huge, and where reducing the frequency of oil changes can mean a big cost savings.

A trans-Atlantic sailor planning to put many hours on the engine between oil changes might benefit from a high-mileage oil and oil sampling, but for most sailors, the existing mineral blends are fine, and a whole lot cheaper given the typical oil change requirements. It is also worth noting that it is probably not a good idea to put a low-viscosity synthetic oil designed for engines that run all the time into an engine that sits for very long periods or will be going into long-term storage.

