

# Bolt Bath

*Seized hardware sets up test of penetrating sprays.*

**R**ust. It can spoil your day. When it builds up between two metal parts that are supposed to move, it can really be a project-stopping pain. For those of us living, working, and playing near water, it shows up all too often.

Rust consists of oxides of iron or steel formed by the action of moisture and oxygen on the metal surface. Salt water, spray, and air add an electro-chemical reaction that can lower the PH and speed up the process.

Using quality stainless-steel hardware and proper maintenance on board should prevent major incidents or inconvenience. However, when left unattended in moist conditions, metal parts on older vessels, machinery, and trailers inevitably will lock up with rust.

There are many products on the market claiming to be “rust removers” or “rust dissolvers.” Most contain acids of some type, are messy to apply, and are not recommended for use on fiberglass boats. (We’ll look at these in a future article.)

Tests that involve rusty bits are not an exact science, primarily because rusted parts are like snowflakes: No two are alike. The chemistry can get complicated, and empirical tests tend to be inconclusive. We tried anyway.

*Practical Sailor* had an immediate need for rust busters when we were refurbishing an old trailer for our O’Day Javelin test boat, *Misty*. Most of the U-bolts and nuts and bolts holding the pads were in various stages of corrosion. So we



*Frozen fasteners on a PS trailer sparked a test of four rust-busting penetrating sprays: CRC Freeze-Off (above), WD-40, Liquid Wrench, and PB Blaster.*

attacked the seized hardware with several penetrating sprays, and a test ensued.

## WHAT WE TESTED

We acquired four aerosol products marketed as penetrating oils that would loosen rusted bolts: WD-40 from the WD-40 Co., Liquid Wrench from Radiator Specialty Co., PB Blaster from the Blaster Corp., and Freeze-Off from CRC Industries.

The products are well known, and the sprays are readily available at local hardware and marine supply stores and online. The sprays have five basic functions:

- Penetrate deep between two metal parts by capillary effect.

- Provide a solvent to dissolve or affect corrosion and rust.
- Displace or dry out moisture.
- Provide a lubricant to ease friction of moving parts.
- Provide a film coating for long-term protection.

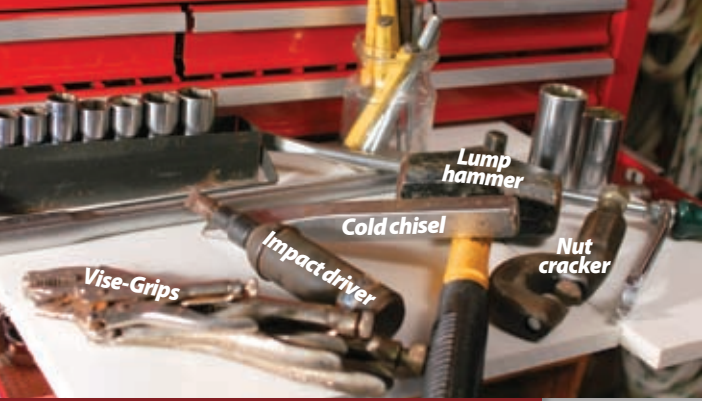
All four tested sprays provided at least three—and sometimes four—of these functions with varying effectiveness. We found that all were good products for what they do.

## HOW WE TESTED

We applied a different spray on the bolts in each quadrant of *Misty’s* trailer and noted the ease of loosening and removing the rusted nuts. Manufacturer directions were followed.

PS	VALUE GUIDE PENETRATING OIL SPRAYS			
PRODUCT	WD-40	LIQUID WRENCH	PB ★ BLASTER	CRC FREEZE-OFF
PRICE SOURCE	Ace Hardware	amazon.com	acehardwareoutlet.com	amazon.com
PRICE / SIZE	\$5.49 / 12 oz.	\$3.58 / 11 oz.	\$4.79 / 11 oz.	\$5.99 / 20 oz.
PRICE/OZ.	46¢	33¢	44¢	30¢
PENETRANT	4th	3rd	Best	2nd
LUBRICANT	2nd	Best	3rd	4th
PROTECTANT	Best	2nd	3rd	4th
PERFORMANCE	Fair	Good	Excellent	Good
NOTES	Displaces moisture and protects	Penetrant and lubricant	Strong solvent and penetrant	Cracks rust and penetrant

★ Best Choice



Specialized tools and carefully applied force may be needed to free some rusty bolts.

## Tools of the Trade for Cracking Nuts

Like a chef with a favorite set of sauce recipes, a good mechanic needs a tried and proven list of tricks to help coax rusted fasteners into submission. Their tools range from penetrants and ingenuity to pure brute force. A breaker bar for sockets and the learned wisdom of just the right amount of torque works much of the time. For really stubborn fasteners, there are nut cutters, and a wide range of torque- and shock-inducing gadgets.

One unusual but effective fastener-freeing technique involves massive thermal change that causes an abrupt material expansion or contraction. A piece of dry ice is pressed against a stubborn bolt head to shrink its dimensions. This results in the disruption of the rusty bond and more willingness for the bolt to turn.

Less esoteric solutions include box or socket wrenches with fewer facets, which afford a tighter grip on a nut or bolt head and allow more torque without stripping the hardware. The better your ability to apply force, the more careful you must be to avoid breaking the fastener.

The rusting process also degrades bolt head shape. A last ditch effort may require a pair of Vise-Grips or sockets designed to grab deformed bolt heads.

Frozen, rusted nuts present a similar problem, but there are tools that allow you to split the nut without destroying the bolt. Nut crackers use a chisel-like edge that is screw-pressed against the side of a nut. Once the tool is tightened, a machinist's hammer is used to smack the tool, and its blade splits the nut.

Light tapping with a hammer was applied to loosen the rust. Wrenches and even a pipe extension were sometimes needed to apply pressure.

In a separate test, we applied Freeze-Off and PB Blaster to an abandoned pump and machinery left outside for several years.

### WD-40

Originally released in 1953, so the story goes, it was the company's 40th attempt to formulate a workable "Water Displacement" formula that was successful, and the name stuck. WD-40 is a petroleum product designed to displace moisture, penetrate between surfaces, provide lubricant, and leave a thin, oily film for protection.



The newer WD-40 cans have a "Smart Straw," a unique, foldable straw permanently attached. Considering the number of red straws we've lost overboard or into the dark recesses of cockpit lockers, testers found the fixed applicator a "smart" innovation indeed.

**Bottom line:** Tests found WD-40 to be best at displacing moisture, providing light lubricant and a thin film for protection, but its solvents were not as effective as others.

### LIQUID WRENCH

Another trusted name in penetrating oils, the petroleum Liquid Wrench was designed to have a capillary effect to penetrate and lubricate in hard-to-get-to places and will loosen some rusted parts. It does not dissolve rust but supplies lubricant and a graphite base to reduce friction, protect metal, and inhibit corrosion. Application requires a red straw that comes taped to the can.

**Bottom line:** Liquid



Wrench does a better job than WD-40 of penetrating, and also provides lubricant and a graphite protectant.

### PB BLASTER

Another old and venerated product, PB Blaster has been around for over 50 years. It is a concentrated copolymer petroleum product with a catalyst that has a unique foaming capillary action.

Its deep penetration qualities are well documented. It has the ability to stick to metal and work its way uphill, breaking surface tension caused by rust and corrosion. Like the others, it includes a lubricant and comes with a red straw applicator.

**Bottom line:** PB Blaster has a strong solvent and deep chemical and capillary penetrating effect. It also contains several lubricants and leaves a thin, oily protective film. It did the best job of loosening the rusted bolts on our trailer, and so takes the top spot for this usage.



### CRC FREEZE-OFF

Less than two years old, CRC's Freeze-Off is not a petroleum oil lubricant, but is specifically designed to loosen rust-bonded metals. Almost half of the formula is the propellant HFC152A, which when exposed to air, immediately drops the temperature of what it touches about 60 to 70 degrees. The formula also includes special penetrating solvents.

The idea is to spray the affected rusted parts for about 10 seconds to cause a sudden drop in temperature that contracts the metal. This should open cracks and fissures in the rust, allowing the solvents to penetrate deep between the metal parts to dissolve more rust. The company claims the formula will not harm fiberglass or plastics, but caution should be taken when using around rubber gaskets.

**Bottom line:** Freeze-Off has the unique ability, under the



right conditions, to contract metal parts so that their solvent can penetrate deeper. It has limited lubricant and protective properties.

**WHAT WE FOUND**

The bolts sprayed with just WD-40 were the hardest to break free. Testers were a little more successful with Liquid Wrench.

The Freeze-Off and PB Blaster applications worked even better. Both of their solvents seemed to have good penetrating power. However, the lower temperature of the Freeze-Off just didn't seem to make a difference. Multiple applications seemed to help, but in the end, the yellow foaming PB Blaster dissolved and loosened more rust.

**CONCLUSION**

*Practical Sailor* talked to three mechanics in metal shops that deal with rust in cars, truck, and trailers. They all reported using PB Blaster to loosen frozen bolts, but admitted applying heat and several good wumps with a hammer to the stubborn ones.

There will be situations when a torch and wumps can't be used. That's when Freeze-Off's concentrated spray and cooling effect to break free a rusted part will be a better choice, especially near fiberglass and plastic.

Depending on the job at hand, all these sprays will work. But the top performer at curing our frozen bolts was PB Blaster. ▲

**CONTACTS**

**WD-40 COMPANY**

888/324-7596, [www.wd40.com](http://www.wd40.com)

**RADIATOR SPECIALTY CO.**

877/464-4865, [www.gunk.com](http://www.gunk.com)

**BLASTER CORP.**

800/858-6605, [www.blasterproducts.com](http://www.blasterproducts.com)

**CRC INDUSTRIES.**

800/521-3168, [www.crcindustries.com](http://www.crcindustries.com)

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- **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
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- **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
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- **JANUARY 2008:** Shannon 37 and 38; Special Report: Navigation Basics; Anchor Test Update; Raritan vs. Jabsc 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; Torqueedo 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 Bailor
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- **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
- **AUGUST 2007:** Pearson 32; Cordage Review: Halyards; Snatch Block Test; The Dark Side of Fiberglass; Plotter/Sounder Update: Garmin 498C; Navigation Software: Nobeltec Admiral 9.1; Exterior Wood Coatings: One-part Varnishes; Chandlery: Fast-drying Wick-er Warmup Towel and Waterproof Ego iPod case
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