

# shop maintenance

## How to bust rust

GET RID OF THE RED SCOURGE AND KEEP IT AT BAY

BY ROLAND JOHNSON



**R**ust, another name for iron oxide, occurs when iron, or a metal alloyed with iron, is exposed to water. The problem is pervasive in wet climates, but even dry climates devoid of big temperature and humidity variations can still see problems with rust. It's inevitable. What's more, short of plating or painting the iron, there's no bulletproof or permanent solution.

So what can we do to get rid of the red scourge? I have a trio of products that I rely on. For these to be effective, you'll need to follow a few simple steps before, during, and after you use them. And once the rust is gone, I have some suggestions for prevention.

### First remove the grime

For any rust remover to be effective, it has to reach below the existing surface rust and neutralize or eliminate freshly forming

rust. If the tool is dirty, start by cleaning the surface with a solvent such as naphtha. Wearing gloves, apply the solvent and scrub any contamination and loose rust off the iron. I use a maroon Scotch-Brite abrasive pad where possible and a wire brush or stiff nylon brush for hard-to-reach places. Small parts I simply drop into a container of solvent for a couple minutes and then scrub clean with a small wire brush.

### Attack the rust

With the grime gone, the rust is exposed and ready to be removed. While there are plenty of products and methods available, I have three favorites— camellia oil; Evapo-Rust, a proprietary rust remover; and phosphoric acid, found in cola—that I choose from depending on the task. I'll discuss some other products and methods, too, and explain why they fall short in my book.

# Simple solution for light rust

Light rust on machines and hand tools may not even need pre-cleaning with a solvent, instead requiring only a quick scrub with light-duty oil and an abrasive. Johnson prefers camellia oil and maroon Scotch-Brite pads.



**Spray and scour.** Spritz on some camellia oil, and use a Scotch-Brite pad to scrub the rust off the tool.



**Wipe it down.** After cleaning off the rust, apply a light layer of camellia oil regularly to protect the tool from further oxidation.

For light spot rust, be it on a hand tool or a tabletop, the process is pretty straightforward, and pre-cleaning may not even be necessary. First, try camellia oil and scrubbing with a maroon Scotch-Brite. If the oil doesn't get all the rust, turn to Evapo-Rust. Evapo-Rust's active ingredient bonds with iron—and only iron—to remove iron oxide without removing iron from steel. It's capable of removing light rust and deeper pits fairly quickly. Additionally, the product is non-toxic, free of volatile organic compounds, and biodegradable—giving me some peace of mind.

Evapo-Rust is my go-to for bigger projects, and using it is easy: Apply it with a brush or via submersion, wait, scrub, apply, wait, scrub, and repeat until rust is gone. That's pretty much it. If the rust is really bad, soak a cotton cloth in Evapo-Rust and lay it on the rusted surface. Be sure to keep the cloth saturated. After a bit, scrub the tool with a Scotch-Brite to check your progress. When it seems like the product's gotten to the bottom of the rust, scrub it clean and dry it off.

The other product I use for rust-ridden jobs is phosphoric acid, which removes rust equally well. It is the basic active ingredient in many rust removers, including naval jelly. It is also a flavoring ingredient in cola sodas. I de-rust my crusty old handplanes, flea-market saws, and chisels by soaking them in a plastic tub full of cola. The process can take anywhere from a day to a couple of weeks depending on how much rust is present and how deep the pits are. What I like about using cola is that it doesn't remove the patination on the iron, won't remove excess metal, won't damage brass or wood, and won't hurt japanning, plating, or paint. It's also non-toxic and really inexpensive.

The drawback to using cola is that you have to keep the piece saturated for an extended period—not your ideal solution for vertical surfaces or large pieces, where you'll have to keep the surface wet with saturated cloths.

There are other, more concentrated forms of phosphoric acid. Naval jelly, which I used to use to derust tools, contains a much higher percentage of phosphoric acid than cola, so it's more

To watch us derust a bandsaw table, go to [FineWoodworking.com/272](http://FineWoodworking.com/272).

## For heavy rust, let it soak



Rustier jobs require a heavier hand. Use a solvent like naphtha to clean affected surfaces before breaking out a derusting agent, such as Evapo-Rust.



**Clean the surface.** Pre-cleaning with naphtha and a maroon Scotch-Brite pad will ensure there's no contamination or wax residue, which could prevent the rust remover from penetrating into scratches and rust pits, thereby allowing rust to reappear soon.



**Keep it wet.** To derust large, flat areas, Johnson saturates towels with Evapo-Rust and then lays them on the rusty surface.



**Scrub off the rust.** Periodically scour the machine to see how much rust has been loosened. If necessary, remoisten the rags. When you can, scrub down the whole area.

aggressive at eliminating rust, and it's a gel, so it can adhere to vertical surfaces. The drawback is that it tends to darken iron and can leave an uneven patina. I don't like ugly tools. High-concentration phosphoric acid, typically sold as concrete rust stain remover, can be purchased at big box stores and is more aggressive than cola, making it better for bigger tools. It's also a lot more expensive.

What about other methods and products? I find many of them too aggressive, such as muriatic acid, sand-blasting, or using a powered wire brush or a disk sander—the last of which doesn't even get into pits. Vinegar and citric acid take too long and are less acidic than cola. Then there's tannic acid, which leaves iron black. As for electrolysis, messing around with chemicals and electricity is more fuss than I want.

### Protect the fresh surface

Dealing with rust is both a leisurely and hurried process. Letting the cola or Evapo-Rust do its work will take some time, but once the rust is neutralized, the residue is cleaned



**Protect with oil.** Camellia oil will repel ambient moisture, keeping tools rust-free if applied regularly. Plus, it doesn't harm finishes or woodworkers, and it doesn't attract dust.

## A sweet technique for hand tools

Phosphoric acid is a potent rust remover, provided you start with a clean surface. Luckily, it's found in common colas, meaning you can get a safe, gentle, inexpensive rust remover anywhere that sells soda. Using it just requires a little time and elbow grease.



**Clean into the nooks and crannies.** Make sure to work the solvent over every part of the tool. Soak small parts in a container, and use a bristle brush where necessary.

**Into the drink.** Cola doesn't remove excess metal, and it won't damage brass or wood. It also won't hurt japanning, plating, patination on the iron, or paint. Plus, it's nontoxic and really inexpensive. But it could require soaking for a couple of days or even weeks before you're able to brush off the rust.



off, and the surface is dry, it's important to work quickly and immediately apply a preventive film to keep air away from the fresh surface. Most rust-removal products leave a very fresh layer of iron exposed, and it can flash-rust in minutes when exposed to air, especially humid air. You may not even necessarily see the flash rust, but it's there, and like a virus it will just keep propagating.

My top rust deterrent is camellia oil. If you prefer wax, though, it's important to use a good-quality wax, like carnauba, that is devoid of silicone, which can cause significant finishing problems if transferred to a workpiece.

Evapo-Rust and some other proprietary rust removers leave a water-resistant film, so it's not as important to immediately apply a film coat to a freshly de-rusted surface. However, the film is only temporary and needs to be reinforced with additional protection.

For a torture test of other rust barriers, see "The Best Rust Preventers" (*FWW* #227).



**Light layer of oil.** The more regularly you oil, the less you'll have to deal with rust.

## Keep the rust away

One key to preventing rust is protection, which means keeping the air from direct contact with your tools.

**Short-term coverage.** For tabletops, Johnson uses a sheet of thin plywood cut a bit larger than the size of the table with blocks around the edge to locate it.



**Long-term protection.** If he's not going to use the tools for awhile, Johnson lays down a layer of plastic sheeting and puts a moving blanket on top to ensure that water stays away.

**Stow away.** To protect your hand tools, shield them from ambient air. Plane socks for handplanes work well. Tool cabinets and tool chests also do the job.



### An ounce of prevention

Prevention is the best cure for rust problems. Regardless of how well you remove rust, if the basic problem of oxidation isn't dealt with, the rust will eventually return.

The main strategy is to consider condensation the enemy. Warm air can hold a significant amount of water, one of the main reasons rust prevention is so difficult in hot, humid climates. When the warm air comes in contact with cool iron, the air molecules shrink, literally squeezing water onto the iron. Without a barrier to the condensation or a way to forestall it, rust will reappear and moisture will eventually penetrate nearly any oil, wax, or protective coating.

One way to interrupt the cycle is by conditioning the air. Heat your shop to above the ambient air temperature as necessary. Similarly, air conditioning, or at least a good dehumidifier, will go a long way toward keeping tools rust-free in wet climates. Also keep the shop doors closed as much as possible. Your wood, and you, will be happier.



Covering tools and machines with a thermal barrier to keep warm air from directly contacting cold metal can also keep rust at bay. If I want the protection to be easily removable, I use a thin sheet of plywood, for example on machine tabletops. This sometimes means cutting a kerf in the sheet, like when sliding one onto a bandsaw.

If a tool is going to be out of service for awhile, I cover it with plastic bags or tarps. Ask your local tool dealer to save some of the plastic bags that tools are shipped in. They'll be happy to give them away rather than toss them in the dumpster. I also use blankets, with a layer of plastic sheeting beneath to provide assurance that water will stay away. Canvas, plastic tarps—there are lots of inexpensive vapor barriers hanging around most shops. Use them. □

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