

Got Rust?

New protectants thrashed old favorites
in our tests

BY THOMAS MCKENNA



If you live in a humid area of the country, you are more than likely familiar with the menacing presence of rust, especially if you work in an unheated basement or garage shop. Left untreated, rust will eat away iron and steel relentlessly, like a hoard of hungry termites on dead wood, causing extensive damage. To help protect your expensive woodworking tools, you need to take steps to prevent rust. One way is to coat iron and steel surfaces with a rust inhibitor. But which one?

Look on any woodworking forum or website, and you'll see a lot of "expert" recommendations about which products to use. To end the debate, *Fine Woodworking* put 20 of these commonly available preventers—from waxes to natural oils to petroleum-based products—through a torture test to see which ones really do work best.

The test results aren't the only answer to stopping rust. In the end we'll give you some sound strategies for fighting rust in your shop. Before you can go to battle, however, it's important to understand how rust forms.

Water is the instigator

Put simply, rust (iron oxide) is a form of corrosion that occurs when both iron and oxygen are exposed to moisture, whether in the air or on the surface. That moisture is the medium through which the players that chemically cause corro-

sion travel. Rust formation can be accelerated with the addition of a stronger oxide or acid—the salt in sea air, for instance, or the moisture from your fingertips (ever see prints on your hand tools?). The process also speeds up with temperature variations that cause condensation. In an unheated garage shop, as a cold night turns to a warm day, condensation settles on the tops of tablesaws, jointers, and bandsaws, as well as on hand tools left on a bench.

The corrosion starts on the surface and spreads like a rash. As corroded metal flakes away, fresh iron surfaces are exposed to the oxygen and water, and the process begins anew until the metal disintegrates. The key to stopping the degradation is to prevent water from mixing with iron and oxygen. And that's what these various coatings are meant to do.

10 days of hell

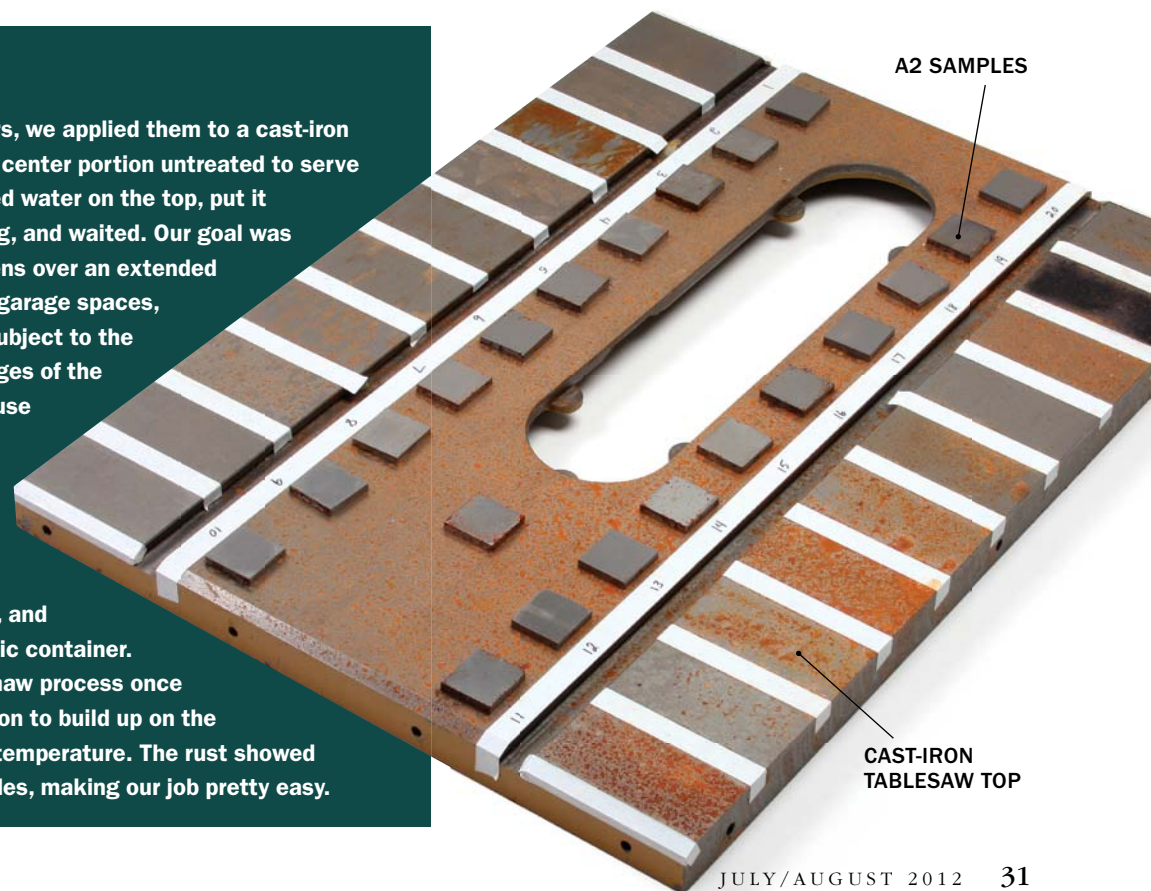
We tried the rust preventers on a cast-iron table-saw top and some samples of A2 tool steel (an iron alloy). All of the samples were subjected to extreme environments (see "A recipe for rust," below). The rust came on strong. We started seeing it on the table-saw top after only one night, and on the tool steel within 48 hours. After 10 days, it was clear which products were working and which were failing.

The top seven performers were CRC Industrial 3-36, LPS 3, Moovit, Rust Block, WD-40,

Tough test

To test the rust preventers, we applied them to a cast-iron table-saw top, leaving the center portion untreated to serve as the control. We spritzed water on the top, put it outside under an overhang, and waited. Our goal was to accelerate what happens over an extended period in some unheated garage spaces, where the top would be subject to the extreme temperature ranges of the outside air that would cause condensation.

We also applied the coatings to A2 steel samples. We placed the samples in a freezer for a few hours, removed them, and put them in a lidded plastic container. We repeated the freeze-thaw process once daily, to allow condensation to build up on the steel as it reached room temperature. The rust showed up quickly on some samples, making our job pretty easy.



A2 SAMPLES

CAST-IRON TABLESAW TOP

Results don't lie

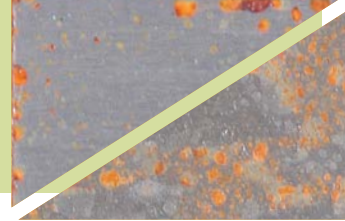
THE BEST OF THE BEST

We picked CRC Industrial 3-36 from the top seven performers as the Best Overall because it worked well on both cast iron and tool steel and did not leave an objectionable sticky or slick residue on the chisel. However, it does have a petroleum odor. Though the smell dissipates, some may find the spray offensive to use on hand tools. For those people, we recommend using the CRC for machines and Moovit for hand tools.



WD-40 Long-Term Corrosion Inhibitor, and 3M Rust Fighter 1. However, a rust preventer is useless if it interferes with your woodworking. So we did further tests so see if any of the top picks would discolor wood, or interfere with finishes or glue adhesion. We took the extreme path again, applying the products directly to wood samples, letting them dry, and then applying both a water-based urethane and an oil-based polyurethane. We also put a dab of yellow glue on the treated boards to see if the products affected adhesion. All of the products discolored wood when applied directly to it, but none of them interfered with the topcoats. The only product that resisted glue adhesion was LPS 3. On that sample the glue popped off pretty easily with a chisel.

Next, for a more realistic contamination test, we applied the top six products to A2 steel samples, rubbed them across some sample boards, and applied the oil- and water-based finishes on top of the boards. None of the samples showed

<p>UNTREATED SAMPLES</p> <p>A2 TOOL STEEL</p>  <p>CAST IRON</p> 	<p>BOESHIELD T9</p> <p>\$10 (4 oz.) rockler.com</p>  	<p>CAMELLIA OIL</p> <p>\$12 (8 oz.) lie-nielsen.com</p>  
<p>PERMATEX RUST TREATMENT</p> <p>\$10 (10.25 oz.) amazon.com</p>  	<p>PROGOLD PG2000</p> <p>\$11 (16 oz.) amazon.com</p>  	<p>RENAISSANCE WAX</p> <p>\$22 (65 ml) rockler.com</p>  
<p>SLIPIT</p> <p>\$10.25 (12 oz.) grizzly.com</p> 	<p>TOPCOTE BY BOSTIK</p> <p>\$19 (10.75 oz.) woodcraft.com</p> 	<p>TOPSAVER</p> <p>\$26 (8 oz.) woodcraft.com</p> 

FAMILIAR PRODUCTS FADED FAST

Waxes and natural oil-based products have often been touted as rust preventers on machines and hand tools. But they didn't fare well in our testing.



WAXES WANED

Waxes work well as lubricants, especially on the bottoms of planes and on machine tops, but they don't offer much protection against rust.

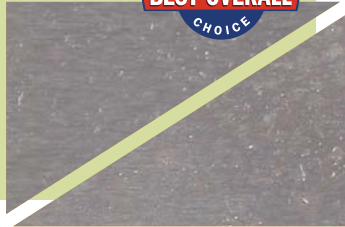
OILS SLIPPED UP

Camellia and Jojoba oils are natural products (made from vegetable oil), so they have a pleasant odor. That quality is partially why they are used often by hand-tool aficionados as a protectant. But in our tests, the products were marginal performers.



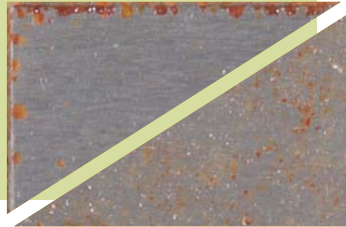
CRC INDUSTRIAL 3-36

\$6 (11 oz.)
amazon.com



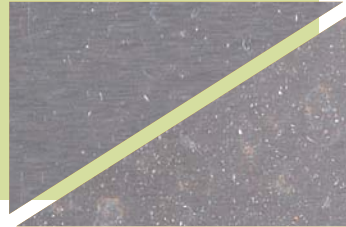
JOJOBA OIL

\$10 (8 oz.)
lie-nielsen.com



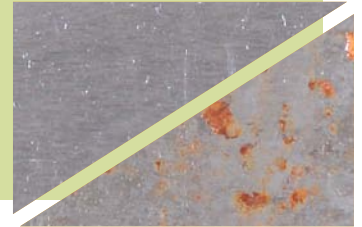
LPS 3

\$15 (11 oz.)
jdindustrialsupply.com



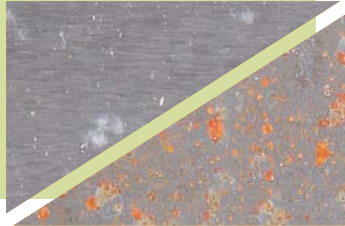
MOOVIT

\$10 (10 oz.)
Leevalley.com



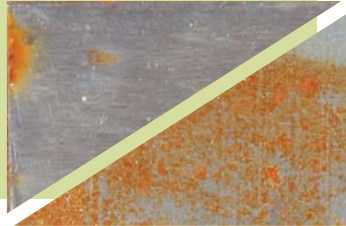
RUST BLOCK BY EVAPO-RUST

\$9 (16 oz.) gemplers.com



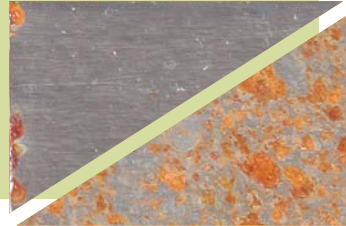
RUSTERIZER ARMOR

\$16 (32 oz.)
amazon.com



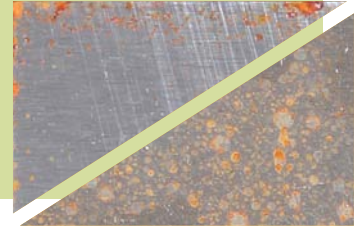
RUST-OLEUM STOPS RUST RUST INHIBITOR

\$11 (10.25 oz.) amazon.com



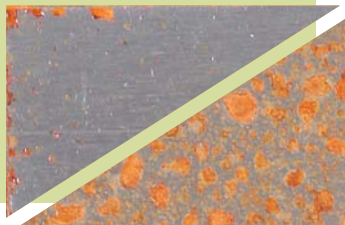
SC JOHNSON PASTE WAX

\$7 (16 oz.) The Home Depot



WAXILIT

\$16 (7 oz.)
leevalley.com



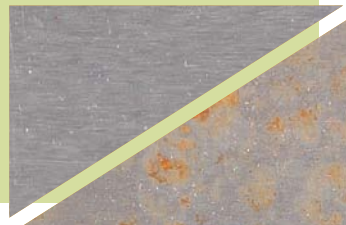
WD-40

\$5.50
Most hardware stores



WD-40 LONG-TERM CORROSION INHIBITOR

\$16 (6.5 oz.) amazon.com



3M RUST FIGHTER-1

\$17 (18 oz.)
amazon.com



any discoloration of the wood, and there were no problems with finish adhesion.

Last, to find out if any products left an objectionable residue on hand tools, we applied them to some chisels and then basically felt them, comparing an untreated chisel with the treated ones. The CRC Industrial 3-36 and Moovit were the favorites here. Each of these products were very close in feel to the untreated chisel.

We also applied the products to a jointer table and gave them a feel for any objectionable residue. Most of the products left a slick surface on the cast iron, a plus for machine tables. The only two that left a visible and tactile residue were 3M Rust Fighter 1 and LPS 3.

The best defense

Making a choice among the products was tough. 3M Rust Fighter 1 and LPS 3 performed perfectly in both torture tests, but we didn't like the sticky feel of the coating that both left on the tool steel and cast iron. Other products did well on one steel but showed kinks in the other. In the end we picked CRC Industrial 3-36 as Best Overall. If you prefer a non-petroleum product for your hand tools, we recommend Moovit.

But the best defense against rust has multiple prongs. Aside from weatherproofing and heating the shop, we also recommend using a dehumidifier to help control moisture. And because none of the products we tested can be applied to the inside of power tools (rust can degrade motor components), we recommend keeping desiccants or corrosion inhibitors in tool cases (above right). □

Thomas McKenna, senior editor, fights rust daily in his basement shop.



Solutions for enclosed spaces. Volatile corrosion inhibitors (VCI) and desiccants help prevent rust in drawers, tool cases, and cabinets. VCIs form a protective coating on tools while desiccants draw moisture from the air.



VCIs

DESSICANTS



Dry the air. You also can curb moisture with a dehumidifier—just remember to empty it regularly. For basement shops, a masonry waterproofing paint keeps moisture from migrating through the porous concrete walls. Garage floors should be sealed as well.

Other ways to manage moisture

The wipe-on or spray products we tested aren't the only weapons available in the battle against rust. Aside from heating the shop or using a dehumidifier, two other options are desiccants and volatile corrosion inhibitors (VCIs). These products prevent corrosion of critical components in contained spaces, such as boxes, drawers, and cabinets. Each does the job differently.

Desiccants are made from a number of porous minerals, including calcium and silica, as well as manmade

compounds. They help prevent rust by removing moisture from the air via the process of *adsorption* (vs. absorption). When a substance is adsorbed, it remains separate from its host, which essentially works as a storage drum. And that storage area is limited. A desiccant compound can become saturated, or full. Some desiccants, such as silica and a few calcium-

based products, can be recharged, or reactivated, with heat to remove the stored moisture and used again.

VCIs emit molecules that settle on metal surfaces, forming a protective layer that repels moisture. VCIs are made by a number of manufacturers from proprietary chemicals and often are infused into a porous carrier material, such as foam. They are disposable and cannot be recharged—some last six months, others work for up to five years.

Desiccants and VCIs both are designed to work in enclosed spaces, and you purchase them based on the square footage of that space. To get the most protection from both products, the storage space needs to be as airtight as possible. If a drawer is left open, the protective tool coating emitted by a VCI will dissipate, while a desiccant will become saturated quickly.