

RUST REMOVAL

SAFE ON EVERYTHING EXCEPT RUST



METAL RESCUE®

METAL RESCUE® Rust Remover Bath is your clean, safe and easy solution to removing rust from iron and steel. Metal Rescue utilizes a unique and selective chelating agent to remove rust (iron oxide) without posing any health, safety or environmental concerns. **METAL RESCUE** is safe on everything except rust! *Just Soak, Check, Rinse/Dry. It's THAT easy!*

FEATURES AND BENEFITS

- CLEAN:** No scrubbing, dipping, brushing, or other agitation.
- SAFE:** No harsh acids, no caustics, no fumes, no health risks, non-hazardous, and safe on skin.
- EASY:** Soak metal part(s) in a plastic container from 10 minutes to 24 hours depending upon the severity of the rust, type of metal and temperature of bath.
- METAL RESCUE** de-rusted parts can be used immediately after removal from bath.

WHY ARMOR?

Armor Protective Packaging® offers rust prevention and rust removal products that are clean, safe, easy, and that protect metals while in-process, in transport, or in storage. ARMOR combines its VCI (vapor corrosion inhibitor) Nanotechnology® with packaging materials such as paper and poly film to create products that displace moisture on metal and guard against rust. ARMOR also offers desiccants, emitters, foam pads and its Metal Rescue® Rust Remover Bath and Dry Coat™ Rust Preventative. For more than 40 years, ARMOR has worked with customers from around the globe to provide rust prevention and rust removal solutions and to Take the Work Out of Your Workday!



Environmentally Friendly:

As supplied, safe for drain or sewer disposal--check local laws for compliance.

Cost-Effective: Saves on labor, clean up, and bath is reusable.

METAL RESCUE will not compromise any mechanical properties or functionality.

Can be used in conjunction with other ARMOR VCI products. After de-rusting, protect metal part with Dry Coat™ Rust Preventative spray, ARMOR WRAP® paper or ARMOR POLY® film/bags for shipping or storage.

ARMOR's Metal Rescue will **Take the Work Out of Your Workday!**



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METAL RESCUE[®] RUST REMOVER BATH

Properties

	Metal Rescue [®]
Carrier	Water Based
VOC's	None
PH	6.0 - 7.0 (neutral)
Specific Gravity as supplied	1.02
Specific Gravity of spent solution	1.08
Optimal Operating Temperature	68° - 150° F (20° - 70° C)
Color	Clear
Boiling Point	212° F (100° C)
Flash Point	None
Shelf Life (packaged as supplied)	Unlimited

Effectiveness and Compatibility

Metal Rescue[®] is effective on oxides. It removes iron oxide (rust) from ferrous based substrates. It also removes bluing, browning, zinc phosphate, and other oxide finishes. It effectively brightens chrome, copper and copper alloys such as brass and bronze.

Metal Rescue will *not* damage any of the following metals:

Aluminum	Gold	Silver
Brass	Lead	Titanium
Chrome	Nickel	Tungsten
	Nickel alloys	Solder or solder points

Metal Rescue will *not* remove the following coatings: Anodizing, Chrome, Nickel, Powder Coating and Paint (Paint(s) must not contain metal oxides).

Metal Rescue is compatible with most materials and will not harm rubber, plastic, clothing, glass, and other surfaces unharmed by water alone.

Metal Rescue is not recommended for use on magnesium, magnesium alloys, or galvanized metal..

CAUTION: Always wash hands thoroughly after handling this product and before eating.

All products manufactured Armor Protective Packaging[®] are warranted to be first class products and free from defects in material and workmanship. Liability under this warranty is limited to the net purchase price of any of such products proven defective or at our option to the repair or replacement of said products upon their return to us transportation prepaid. All claims on defective products must be made in writing 30 days after the receipt of such products in your plant and prior to further processing or combining with other materials and products. We make no warranty, express or implied, as to the suitability of any of our product for any particular use, and we shall not be subject to liability from any damages resulting from their use in operations not under our direct control. This warranty is exclusive of all other warranties, express or implied, and no representative of ours or any other person is authorized to assume for us any other liability in connection with the sale of our products.

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Product Overview

Metal Rescue employs innovative new technology that efficiently removes rust without harming surrounding materials. It is water-based, non-hazardous, biodegradable and environmentally friendly to use. Metal Rescue has effectively removed heavy rust on all types of mild steel and iron and also removes some oxides on copper and copper alloys such as brass and bronze. Metal Rescue is non-flammable and contains no petroleum solvents. It is non-hazardous, non-corrosive, and has a neutral pH.

Use Life

Metal Rescue can be used again and again. One gallon of Metal Rescue will remove 1/2 pound of dry rust - the equivalent of removing rust from approximately 300 pounds of moderately rusted steel. If any Metal Rescue bath evaporates, simply replace it with fresh tap water to its original level. Metal Rescue's rust removal capabilities begin to exhaust as the bath turns black, however, it can continue to work even when the solution is dark. The liquid turns black because the iron oxide particles that are removed from the iron/steel become absorbed into the liquid. The pH of fully exhausted product will be approximately 7.2 and the specific gravity will change from 1.02 to 1.08. The best way to measure specific gravity is by using a hydrometer. They are easily available and cost between \$10 and \$20. It is important to measure the specific gravity of Metal Rescue at a given temperature because the temperature of the liquid will affect the specific gravity. (For more information on measuring specific gravity please see the section below)

When Metal Rescue is used within a multiple tank system, cross contamination can occur from degreasers, coolants or other chemicals used within the process, influencing the quantitative measurements of pH and specific gravity. Temperature has an effect on specific gravity requiring that a hydrometer with temperature capability be used. *If the operation is consistent*, the temperature and any incoming contamination fluids should be relatively consistent (except in the case of overflow and mechanical problems). Record a specific gravity and pH measurement at the beginning of the tank operation (fresh Metal Rescue) at normal operating temperature so that a baseline can be established. Perform regular recordings of specific gravity and pH 3-4 times per shift and use these numbers to track performance until product fails to work as expected. The last reading with good product results will be the point at which the product should be titrated. These numbers may be slightly different for all operations due to the temperature of the fluid, contamination type, amount of cross contamination and mechanical issues. Consult with ARMOR's Technical Services department for specific assistance with your application.

Measuring Specific Gravity

A hydrometer is an instrument used to measure the specific gravity or relative density of liquids; that is, the ratio of the density of the liquid to the density of water. Specific gravity measurements are often reported at a given temperature because the temperature of the liquid will affect the specific gravity of the liquid. They are commonly used for home brewing and wine making, and also used by people who keep salt water aquariums. Additionally, most manufacturing facilities with laboratories or chemical processes have several ways to measure the specific gravity of a liquid.

A hydrometer is usually made of glass and consists of a cylindrical stem and a weighted bulb at the bottom to make it float upright. The liquid to be tested is poured into a tall container, often a graduated cylinder, and the hydrometer is gently lowered into the liquid until it floats freely. The point at which the surface of the liquid touches the stem of the hydrometer is noted. Hydrometers usually contain a scale inside the stem, so that the specific gravity can be read directly. Some hydrometers also contain a thermometer so the liquid temperature can be measured at the same time.

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Temperate Alert

Optimal operating temperatures for Metal Rescue are 68°F (20°C) to 150°F (65°C).

Discoloration

Black oxide can form on certain steel alloys and high carbon steel when left in Metal Rescue for long periods of time. Black oxide is a corrosion inhibiting film that is a more stable state of oxidized iron. It is not detrimental to the metal surface and is only cosmetic in nature. Reducing the time that the part is immersed in the liquid will minimize the formation of black film. Much of the black oxide film can be removed simply by rinsing with mild detergent or wiping with a cloth. It is best to remove black oxide immediately after removing parts from the Metal Rescue bath and before the parts dry. Black oxide becomes more difficult to remove for parts that have soaked for long periods of time. *It is best to soak rusted parts only as long as needed to remove the rust.*

Shelf Life

An unopened bottle of Metal Rescue has an infinite shelf life. Once opened, the shelf life of the solution will vary due to biodegradability. After using Metal Rescue, it is best to cover the bath, and allow air to flow over the surface. Pouring used solution into a sealed container allows anaerobic bacteria to begin the degradation process. Open baths, covered to prevent too much evaporation, will continue to operate effectively for up to 12 months.

Disposal

As supplied, Metal Rescue contains no VOC's, solvents, harsh acids, bases, or hazardous ingredients. Metal Rescue is biodegradable after use and in most locations directly sewerable unless hazardous waste or contaminants (certain oils, paints, heavy metals, etc.) are introduced into the bath during use. Check local, state, and federal disposal requirements to ensure proper and legal disposal to the drain.

Safety

Metal Rescue is an extremely safe water-based solution. It is non-corrosive, non-flammable, non-hazardous, fume-free and does not contain any hazardous ingredients. Fundamental safety steps are recommended: Avoid contact with your eyes. If eye contact occurs, flush with water. The use of gloves is recommended, but not necessary.

Preparation

Pre-cleaning is not required, but excessive surface contaminants and loose rust will slow the rust removal process. ARMOR recommends the removal of anything that could act as a barrier to Metal Rescue making direct contact with the surface of the metal (dirt, oil, and other contaminants). Because Metal Rescue contains no surfactants, it is highly recommended that cosmoline, heavy greases, and similar materials be removed prior to de-rusting.

Immersion

Surfaces to be de-rusted must remain in constant contact with Metal Rescue to be effective.

There are several factors that shorten or lengthen immersion time:

- Severity of rust: Light surface rust will require 5-30 minutes, moderate rust up to 4 hours, and heavily rusted items that have been left unprotected for years may take up to 24 hours.
- Bath temperature: The temperature of Metal Rescue will affect the required immersion time. The rust removal process will proceed more quickly at higher bath temperatures. Operating temperatures for Metal Rescue are 68°F (20°C) to 150°F (65°C).

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Rinse

Once the rust has been removed, the entire surface should be rinsed with water and dried thoroughly. Items that were heavily rusted may have loose material on the surface that can be removed with a brush, sponge, or high pressure spray.

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