

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 acids, no caustics, no health risks, non-toxic, and safe on skin.
- EASY:** Soak the part(s) in a plastic container from 10 minutes to 24 hours depending upon the severity of the rust, type of metal and liquid temperature. **METAL RESCUE™** de-rusted parts are available for immediate use after removing from liquid.

WHY ARMOR?

Armor Protective Packaging® provides the industry's cleanest, easiest, safest and most effective corrosion management systems for metal products to a global customer base. ARMOR's full line of vapor corrosion inhibitor (VCI) packaging products, desiccants and our rust removal and prevention liquids are designed to protect metals before, during and after transport or storage. ARMOR's industry reputation as a trusted business partner has been built by serving our customers and preserving their investments for more than a quarter-century.



Environmentally Friendly:
Safe for drains or sewer systems (Check local laws for compliance).

Cost-Effective: The most efficient, easy, and safe way to remove rust.

METAL RESCUE™ will not compromise any mechanical properties or functionality.

The valued ARMOR brand is a trust name that means reliability and confidence.

Can be used in conjunction with other ARMOR VCI products. After de-rusting, place part inside ARMOR VCI® products for shipping or storage.



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ARMOR PROTECTIVE PACKAGING CORROSION MANAGEMENT SOLUTIONS

METAL RESCUE™ RUST REMOVER

Properties

	Metal Rescue™
Carrier	Water Based
VOC's	None
PH	6.5 - 7.5 (neutral)
Specific Gravity as supplied	1.02
Specific Gravity of spent solution	1.08
Operating Temperature	60° - 150° F (15° - 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
Copper	Nickel	Tungsten
Chrome	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 surface unharmed by water alone.

Metal Rescue™ is not recommended for use on magnesium or magnesium alloys.

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-toxic, biodegradable and environmentally safe 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-toxic, non-corrosive, and has a neutral pH.

Useful 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 of the Metal Rescue™ solution evaporates, simply replace it with fresh tap water. Metal Rescue's™ de-rusting capabilities begin to exhaust as the bath turns black, however, 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.

RUST REMOVAL

ARMOR PROTECTIVE PACKAGING CORROSION MANAGEMENT SOLUTIONS

Temperate Alert

Metal Rescue should be used at room temperature (68°) or above.

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™ is biodegradable, and contains no VOC's, solvents, harsh acids, bases, or hazardous ingredients. Metal Rescue is considered to be a non-hazardous, non-toxic product and typically does not pose a problem with disposal. Although the product is not hazardous, contaminants may be introduced during the use of the product that could render the product hazardous if in amount that are above the hazardous waste limits. You should always check with your local, state & federal authorities 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-toxic, 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 isn't necessary but excessive surface contaminants will slow the de-rusting process. Removing surface contaminants and loose rust will also extend the life of the Metal Rescue™ bath. ARMOR recommends removing as much dirt, oil, and other contaminants as possible from the item to be de-rusted. Metal Rescue™ will penetrate oil and dirt, but oil and dirt must be penetrated before Metal Rescue™ can directly contact the rust underneath. It is highly recommended that cosmoline, heavy greases, and similar materials be removed prior to de-rusting.

Immersion

Surfaces to be de-rusted must be fully immersed; Metal Rescue™ must maintain contact with the rusted surface to be effective.

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Immersion continued

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 de-rusting process will proceed more quickly at higher bath temperatures. ARMOR recommends that Metal Rescue™ be used at room temperature or above (60° – 100° F).

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.

Questions

Please contact the Technical Services department at Armor Protective Packaging® for further questions.

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Updated 02-19-15, correct specific gravity