Metal Rescue™ Rust Remover
Technical Data

Product Description

Metal Rescue™ is an innovative new technology that efficiently removes rust without harming surrounding materials. It is a water-based, non-toxic solution that is biodegradable and environmentally safe to use. Metal Rescue™ has been proven effective to remove even heavy rust on all types of mild steel and iron. It will also remove 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.

Properties	**Metal Rescue™**
Carrier	Water Based
VOC's	None
PH	6 -7
Specific Gravity as supplied	1.02
Specific Gravity of spent solution	1.06
Operating Temperature	60 F – 150F (15° - 70° C)
Color	Clear
Boiling Point	212° F (100° C)
Flash Point	None
Shelf Life (packaged as supplied)	Unlimited

De-Rusting Mechanism

The active ingredient in Metal Rescue™ bonds to rust while leaving surrounding materials unharmed. It uses a specially engineered molecule that is specifically designed to form a bond with the iron in iron oxide (rust) and holds it in solution. However, Metal Rescue™ is too weak to remove iron from the steel, leaving the substrate unharmed. This process is called selective chelation.

International HQ 951 Jones Street · Howell, MI 48843 USA
PH 800.365.1117 517.546.1117 info@armorvci.com **FX** 517.546.6434 armorvci.com

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Effectiveness and Compatibility

Metal Rescue™ is effective on oxides. It will remove iron oxide (rust) from ferrous based substrates. It will also remove bluing, browning, zinc phosphate, and other oxide finishes. It effectively brightens 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 as long as the paints do not contain metal oxides.

Metal Rescue™ is compatible with most other materials:

It will not harm rubber, plastic, clothing, glass, and other surfaces that are unharmed by water alone.

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

Discoloration

Metal Rescue™ may leave a black film on some parts. The black is a carbon film from the steel. As the iron oxide rust is removed, carbon left over from the rust remains on the surface. High carbon steel and tool alloy steel items, when de-rusted, will have a darker appearance. For these metals reducing the time that the part is immersed in the liquid will minimize the black film. Much of the carbon film can be removed simply by rinsing with mild detergent or wiping with a cloth. Also, remove carbon immediately after removing parts from Metal Rescue and before the parts dry. The carbon film 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.

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Useful Life

Metal Rescue™ can be used over and over until it stops working. One gallon of Metal Rescue™ will remove 1/2 pound of dry rust. That is equivalent to 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 are used up when the bath will turn completely black and will not perform. The pH will be approximately 7.2 and the specific gravity will change from 1.04 to 1.08.

Shelf life

Metal Rescue™ has an infinite shelf life (for un-opened product). Once opened, the shelf life of the solution will vary due to biodegradability. After using Metal Rescue™, it is best to cover the bath, but still allow air to flow over the surface. Used solution that is poured back into a sealed container will allow anaerobic bacteria to begin the degradation process. Open baths that are 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, 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. However, we still recommend basic safety steps. Avoid contact with your eyes. If eye contact occurs, flush with water. We also recommend the use of gloves. For additional safety information please see the MSDS sheet.

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Application and Process Recommendations

Preparation

ARMOR recommends removing as much dirt, oil, and other contaminants from the substrate to be de-rusted as possible. Metal Rescue™ will penetrate oil and dirt. However, surface contaminants slow the de-rusting process. Oils and dirt must be penetrated before Metal Rescue™ can directly contact the rust underneath. Cosmoline, heavy greases, and similar materials should 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. There are many factors that shorten or lengthen the required 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 effect 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 temperatures or above (60° – 100° F).

Surface contamination: Pre-cleaning isn't necessary but surface contaminants will slow the de-rusting process. Removing surface contaminants and loose rust will also extend the life of Metal Rescue™.

Rinse

Once the rust has been removed, the surface should be rinsed with water. Items that were heavily rusted may have some loose material on the surface. This can be removed with a brush, sponge, or higher pressure spray.

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Protect

Metal Rescue™ can also be used as a temporary rust inhibitor. To prevent re-rusting, wet the item again with Metal Rescue™ and let dry. This can be accomplished by dipping or spraying. This step will protect the item for a few weeks if kept indoors. For longer protection, we recommend using ARMOR corrosion inhibiting packaging.

Questions

Please contact the Technical Services department at ARMOR Protective Packaging® for further questions. wmeasel@armorvci.com or rmcconnell@armorvci.com , Phone (1) 517-546-1117.

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