



RemOx® S-D ISCO reagent has been specifically manufactured for environmental applications such as remediation of soils and associated groundwater. This product can be used to degrade a variety of contaminants including chlorinated solvents, polyaromatic hydrocarbons, phenolics, organo-pesticides, and substituted aromatics. RemOx S-D is shipped with a certificate of analysis.

## REMEDIATION GRADE

### Assay

3% ( $\pm 0.5\%$ ) as  $\text{KMnO}_4$

### Trace Metals

(see Table I)

## CHEMICAL/PHYSICAL DATA

|   |                                  |
|---|----------------------------------|
| <b>Formula</b>                                    | $\text{KMnO}_4$                  |
| <b>Formula Weight</b>                             | 158.0 g/mol                      |
| <b>Appearance</b>                                 | Dark purple solution             |
| <b>Specific Gravity</b>                           |                                  |
| 3% Solution                                       | 1.020 g/mL by weight, 20°C / 4°C |
| <b>Decomposition may start at 150° C / 302° F</b> |                                  |

## APPLICATIONS

RemOx S-D is used for soil and groundwater remediation by *in situ* or *ex situ* chemical oxidation for treatment of: chlorinated ethenes, phenolic compounds, polyaromatic hydrocarbons, RDX, HMX, and various pesticides.

## SHIPPING CONTAINERS

**Bulk Shipping** (domestic only)- Quantities up to 5000-gallons are available.

## HANDLING, STORAGE, AND INCOMPATIBILITY

Like any strong oxidizer RemOx S-D should be handled with care. Protective equipment during handling should include face shields and/or goggles, rubber or plastic gloves, and rubber or plastic apron. If clothing becomes spotted, wash off immediately; spontaneous ignition can occur with cloth or paper. In cases where significant exposure exists use the appropriate NIOSH-MSHA dust or mist respirator.

Store in accordance with NFPA (National Fire Protection Association) Code 430 requirements for Class II oxidizers. The product should be stored in a cool, dry area in closed containers. Concrete floors are preferred. Avoid wooden decks. Spillage should be collected and disposed of properly. To clean up spills and leaks follow the steps recommended in our MSDS.

Avoid contact with acids, peroxides, and all combustible organic or readily oxidizable materials including inorganic oxidizable materials and metal powders. With hydrochloric acid, chlorine gas is liberated. RemOx S-D is not combustible, but will support combustion. It may decompose if exposed to intense heat. Fires may be controlled and extinguished by using large quantities of water. Refer to the MSDS for more information.

## SHIPPING

RemOx S-D is classified by the Hazardous Materials Transportation Board (HMTB) as an oxidizer. It is shipped under Interstate Commerce Commission's (ICC) Tariff 19.

**Proper Shipping Name:** Potassium Permanganate (RQ-100/45.4)

**Hazard Class:** Oxidizer

**Identification Number:** UN 1490

**Label Requirements:** Oxidizer

**Packaging Requirements:** 49 CFR Parts 100 to 199

**Sections:** 173.152, 173.153, 173.194

### Shipping Limitations:

*Minimum quantities:*

Rail car: See Tariff for destination

Truck: No minimum

## CARUS CORPORATION

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## SHIPPING

### Postal regulations:

Information applicable to packaging of oxidizers for shipment by the U.S. Postal Service to domestic and foreign destinations is readily available from the local postmaster. United Parcel Service accepts 25 lbs as largest unit quantity properly packaged; (consult United Parcel Service). Regulations concerning shipping and packing should be consulted regularly due to frequent changes.

## CORROSIVE PROPERTIES

RemOx® S-D ISCO reagent is compatible with many metals and synthetic materials. Natural rubbers and fibers are often incompatible. Solution pH and temperature are also important factors. The material must be compatible with either the acid or alkali also being used.

In neutral and alkaline solutions, RemOx S-D is not corrosive to iron, mild steel, or stainless steel; however, chloride corrosion of metals may be accelerated when an oxidant such as permanganate is present in solution. Plastics such as polypropylene, polyvinyl chloride Type I (PVC I), epoxy resins, fiberglass reinforced plastic (FRP), Penton, Lucite, Viton A, and Hypalon are suitable. Teflon FEP and TFE, and Tefzel ETFE are best. Refer to Material Compatibility Chart.

Aluminum, zinc, copper, lead, and alloys containing these metals may be (slightly) affected by RemOx S-D solutions. Actual studies should be made under the conditions in which permanganate will be used.

Table I: Typical Trace Metal Content and Specifications

Reported values in table are derived from RemOx® S ISCO reagent used to manufacture RemOx S-D

| Element | Typical Analysis (mg/kg) | Specifications (mg/kg) | DL* (mg/kg) | Element | Typical Analysis (mg/kg) | Specifications (mg/kg) | DL* (mg/kg) |
|---------|--------------------------|------------------------|-------------|---------|--------------------------|------------------------|-------------|
| Ag      | BDL                      | 0.40                   | 0.048       | Hg      | BDL                      | 0.05                   | 0.004       |
| Al      | 55.85                    | 115.00                 | 0.28        | Na      | 228.03                   | 750                    | 0.069       |
| As      | 0.04                     | 4.00                   | 0.006       | Ni      | 0.78                     | 5.00                   | 0.048       |
| Ba      | 10.60                    | 50.00                  | 0.016       | Pb      | BDL                      | 1.00                   | 0.20        |
| Be      | BDL                      | 0.50                   | 0.10        | Sb      | BDL                      | 1.00                   | 0.20        |
| Cd      | BDL                      | 0.10                   | 0.02        | Se      | BDL                      | 1.00                   | 0.002       |
| Cr      | 1.60                     | 7.50                   | 0.028       | Tl      | BDL                      | 5.00                   | 1.00        |
| Cu      | 0.15                     | 3.00                   | 0.034       | Zn      | 0.87                     | 6.00                   | 0.016       |
| Fe      | 0.22                     | 100.00                 | 0.066       |         |                          |                        |             |

DL\* = Detection limit BDL = Below detection limit

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