

# CALMET® HEAVY METAL PRECIPITANT

**Calmet** (Calcium Polysulfide Solution) is a lime-sulfur based liquid solution designed to be used in various treatment systems as a metal precipitating agent. When used as part of a waste treatment program, **Calmet** effectively stabilizes and reduces soluble metals. Soluble toxic metals, such as chromium, lead, arsenic, cadmium and copper, as well as other heavy metals could be a major health risk. Geochemical fixation using a chemical reductant such as **Calmet** converts the soluble toxic metals into an insoluble nontoxic compound. The extent of metals precipitation is a function of the pH environment. Metal hydroxides change solubility with changes in pH. Metal sulfides remain insoluble within a pH range of about 5 to 9. **Calmet** with a pH range of 10.5 to 11.5 typically forms sulfides with most metals and hydroxides in the case of chromium.

**Calmet** is a 29% aqueous solution of calcium polysulfide. It forms a filterable sludge and operates well in areas where the pH of the system is higher than 7.0. The excess calcium precipitates as calcium carbonate or gypsum (calcium sulfate). Liquid **Calmet** is easy to apply and handle in comparison to solid materials that must be dissolved prior to application.

## TYPICAL PROPERTIES

Active Solids	29%
Specific Gravity	1.27
Approximate Weight per US Gallon	10.6 lbs
pH (Neat)	10.5-11.5
pH (300 ppm In DI Water)	9.88 @ 24°C (Water pH is 7.05)
pH (300 ppm In Tap Water; Solution Is Cloudy)	9.18 @ 24°C (Water pH is 7.55)

## PACKAGING AND HANDLING

**Calmet** is a water-soluble liquid packed in non-returnable drums, totes or shipped in bulk tank trucks or railcars. Store totes, drums and small containers out of direct sunlight at moderate temperatures. Materials of construction suitable for storing and handling the product at ambient temperature [up to 49°C (120°F)] include stainless steel, polypropylene and polyethylene. Handle in enclosed containers to avoid breathing product vapors (H<sub>2</sub>S).

Avoid contact with acids or acidic materials (evolve H<sub>2</sub>S). Avoid contact with skin and eyes. Dilute only in enclosed containers. Use in a well ventilated area. Wash thoroughly after handling. Observe all safety precautions shown on the product label and in the material safety data sheet. Improper handling of this product can be injurious to workers.

FIGURE 1

## ADJUSTMENT OF pH CAN ENHANCE THE PRECIPITATION PROCESS

Metal	Arsenic	Lead	Copper	Zinc
Treatment notes	Acid medium only forms various arsenic sulfides; pH>7; arsenic-sulfur compounds are soluble; pH<7 the compounds are insoluble	Wide range (pH: 4-9); forms lead sulfide	Close to neutral (optimal pH: 5-7); forms copper sulfide	Wide range (pH: 4-9); forms zinc sulfide
Metal	Cadmium	Molybdenum	Uranium	Cyanide
Treatment notes	Wide range (pH: 4-9); forms cadmium sulfide	Wide range (pH: 4-9); forms molybdenum sulfide	Wide range (pH: 4-9); forms uranium sulfide	Chemical conversion produces thiocyanate*

\*Thiocyanate can be bio-treated, or it can be treated with lime, producing calcium carbonate, gypsum and ammonia. Chromium (Cr VI) can be treated with calcium polysulfide, and the Cr (VI) is reduced to Cr (III), which is then precipitated as chromium hydroxide.

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