

CALMET[®]
**FOR WASTEWATER
TREATMENT AND
SOIL REMEDIATION**

CALMET®

IS A WATER-BASED CALCIUM - POLYSULFIDE SOLUTION
DESIGNED TO BE USED IN VARIOUS TREATMENT SYSTEMS
AS A METAL PRECIPITATING AGENT.

Geochemical fixation using Calmet converts
the soluble toxic metals into insoluble non-toxic compounds.

WHY CALMET®?

- **Converts** hexavalent chromium [Cr(VI)] to trivalent chromium [Cr(III)] to precipitate Cr(III) as chromium hydroxide in a one step reaction
- **Provides** soluble sulfide precipitation of heavy metals for easy, low cost treatment
- **Precipitates** metals from chelation, avoiding a separate process
- **Reduces** mercury in waste streams to low parts per billion
- **Produces** its own flocculant, reducing treatment costs
- **Is versatile** and can be adapted to enhance existing treatment systems
- **Meets ANSI NSF 60 Standard** for drinking water

Calmet is easy to apply and handle in comparison to solid materials. Calmet does not need to be dissolved prior to use. When used as part of a wastewater treatment program, Calmet effectively stabilizes and reduces soluble metals. Calmet typically forms filterable sulfide sludges on treatment; an exception is treatment of chromium, which forms hydroxides. Any excess calcium usually precipitates as calcium carbonate or gypsum (calcium sulfate); the extent of effectiveness in treatment is generally a function of the pH of the system.

The following table highlights the effective treatment with system pH near 4.0, Calmet is the most stable in systems with pH greater than 5.0, to avoid potential generation of hydrogen sulfide (H₂S).

TREATMENT OF SOLUBLE METAL STREAMS

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*
METAL	Chromium	Silver	Nickel	
TREATMENT NOTES	Reduction produces Cr(III) [†] ; Cr(III) hydroxide has very low solubility (pH 7-11) [‡]	Sulfide has very low solubility over wide range (pH 3-11) [‡]	Sulfide has very low solubility over wide range (pH 3-10) [‡]	

[Reference: Groundwater Resources Association of California; Hydro Visions - Volume 10, No. 2; Summer 2001]

* Thiocyanate can be bio-treated, or it can be treated with lime, producing calcium carbonate, gypsum and ammonia.

† Chromium [Cr(VI)] is reduced by calcium polysulfide to Cr(III) which is then precipitated as chromium hydroxide.

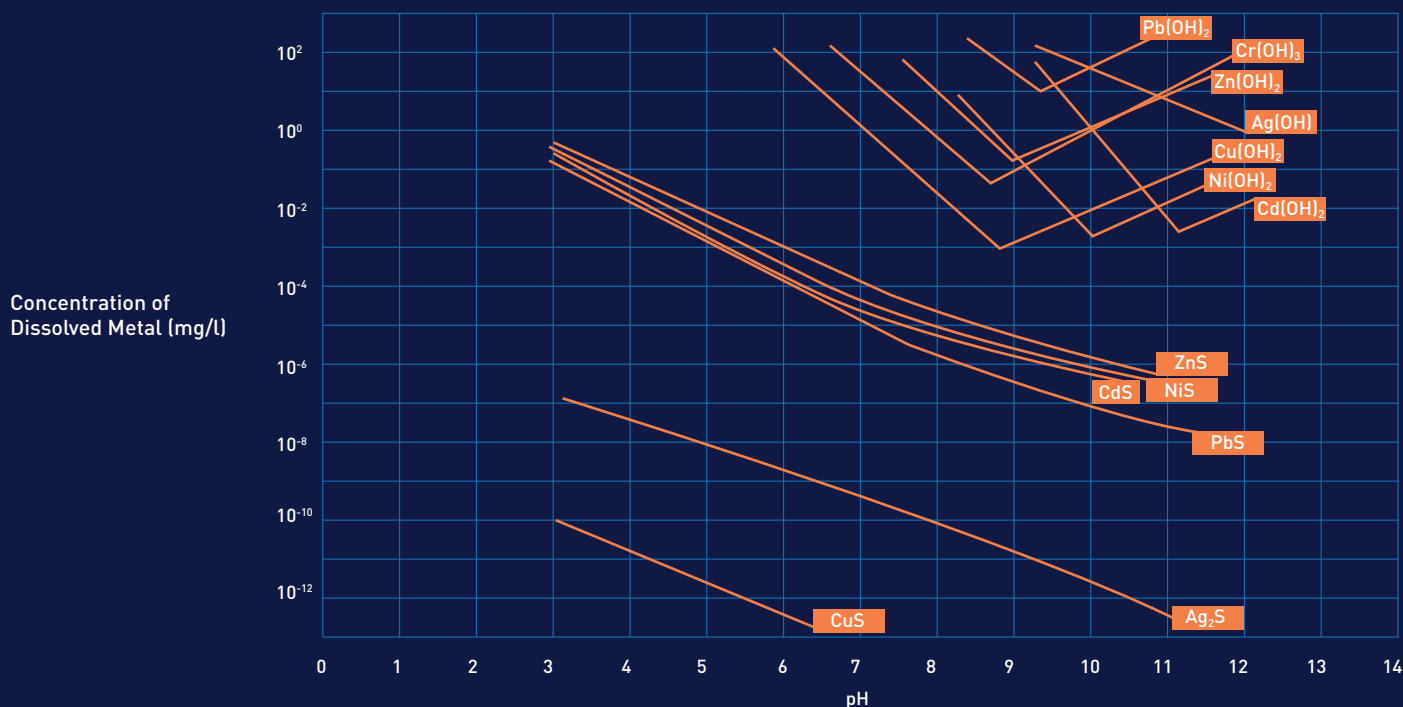
‡ Data from graph. EPA, 1981

SUCCESSFUL USE OF CALMET®

Calmet precipitates heavy metals as insoluble metal sulfides* which are far less soluble than metal hydroxides.



Solubility of Metal Hydroxides and Sulfides as a Function of pH



TYPICAL PROPERTIES

Active Ingredient	27-29%
Approximate Specific Gravity	1.27
Approximate weight per US Gallon	10.6 lbs
pH (neat)	10.7-11.7
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)

* Chromium is precipitated as chromium hydroxide by Calmet's strong base. Calmet converts cyanide to thiocyanate, a non-hazardous substance.

PACKAGING AND HANDLING

Calmet is a water-based liquid and is available in non-returnable drums or 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 Calmet at ambient temperatures [up to 49°C (120°F)] include stainless steel, polypropylene and polyethylene.

Handle and dilute Calmet in enclosed containers to avoid exposure to product vapors (H_2S). Avoid mixing Calmet with acids or acidic materials, due to H_2S evolution. Avoid contact with skin and eyes. Use Calmet in a well ventilated area, and wash thoroughly after handling. Observe all safety precautions shown on the product label and in the material safety data sheet.

Building confidence into our products

Whatever your needs, when it comes to environmentally sound and effective sulfur-based metal precipitants and reductants, we provide the highest quality products and comprehensive solutions for wastewater treatment and soil remediation applications.

moleko™

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