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DTOX INFORMATION SHEET

DTOX is a wastewater treatment product that precipitates heavy metal ions and neutralises cyanide. **DTOX reacts** quickly with free and complex cyanides. The end products are ultimately released to the environment as carbonates and ammonia (can be beneficial to flora). Test work has shown that the reaction is rapid and much safer than hypochlorite.

Advantages

- Easy to use
- Readily available
- Manufactured in Western Australia
- More rapid than other methods
- Much safer than hypochlorite.
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DTOX comes in solution form.

It can be used to rid wastewater of such hazardous metals such as chromium, copper, silver, lead, cadmium, mercury, nickel, zinc, arsenic and selenium.

The sulphide component of **DTOX** precipitates the heavy metals as their very insoluble sulphide minerals (most of which occur in nature). These can then be either recovered for resale or safely discharged into the environment.

DTOX precipitation of metals is relatively insensitive to chelating agents and eliminates the need to treat those wastes separately. This sulphide process has the ability to remove chromates and dichromate without preliminary reduction of the chromium in the trivalent state.

DTOX can be incorporated into previously existing treatment facilities with minimal costs. In most cases a simple dosing pump is all that is required.
Industries that would have an application for the product include gold and silver processing, electroplating and metal finishing where heavy metal ions or cyanide are present in solution.

Procedure for Test-work

Measure cyanide concentration of water to be treated in ppm.

Dose DTOX at a rate of ~2.5mL per tonne of water per ppm of cyanide plus ~7.5mL per ppm heavy metals.

Allow 2 days for reaction and measure residual cyanide and heavy metals

Note: residual cyanide **cannot** be measured by an unmodified silver titration or ion selective electrode due to interference by excess sulphide ion. Use **WAD** (weak acid dissociable) technique after precipitating and filtration of any excess sulphide with lead acetate)

APPLICATIONS

Assay Laboratories use **DTOX** to conveniently and safely neutralise their cyanide and heavy metal waste in their wastewater streams.

DTOX may be used on mine sites to destroy cyanide and to precipitate and "lock up" heavy metals in their tailings.

Heavy Metal contaminated ground water plumes have been successfully treated using **DTOX**. The contaminated water is pumped from the centre of the plume into a treatment facility where DTOX is added to precipitate and collect the heavy metals. The treated water is then returned to the perimeter of the plume effectively forcing the contaminated water into the centre of the plume facilitating removal for treatment.

Many Electroplaters use **DTOX** to treat their solution waste prior to disposal.

DTOX is sold as an aqueous solution (s.g. 1.25 – 1.30) containing ~36% w/w active sulphur compounds.

DTOX is available in 20 litre drums, 200 litre drums, 1,000 L IBCs and in bulk.

INDICITATIVE COSTS

(Accurate as of June 2018 but subject to change without notice)

Full container load in 200 L drums	$POA
1000L IBC	$1590.50*
Pallet (4 x 200L drums, 1,000kg)	$1360.00*
200 L drum	$375.00*
20 L drum	$58.40*

DOSE

- 250 kg **DTOX** destroys ~ 80kg of cyanide,
- 1 tonne **DTOX** destroys ~ 320kgs of cyanide at a cost of ~$3.60* per kg cyanide,
- For example: at 50ppm cyanide in discharge: 20,000 litres of water contains 1kg of cyanide. This requires about 3.13kg (2.4L) DTOX at a cost of $4.05 (assuming cyanide only present). **Therefore, final reagent costs for this example can be as low as $0.20* per tonne of water depending upon dose required.**

BACKGROUND

The reaction between cyanide and polysulfide-sulphur to form thiocyanate was used as early as 1896 to convert hydrogen cyanide in coke oven gas to thiocyanate. International Environmental Consultants (1979, 1981) investigated the use of the reaction for treatment of cyanide containing wastewaters from the global milling industry. However, no published data were available before the preliminary study by Takaoka and Ganczarczyk (1985). These experiments were conducted to investigate the reaction in a 2% (20,000 mg/L) solution of sodium cyanide. It was found that the reaction was 95% complete within one hour, and cyanide concentrations were non-detectable within two weeks at a CN: poly S^0 ratio of 1:2 (w/w).

In follow up research, Ganczarczyk et al (1985) studied the reaction in two different cyanide containing wastewater streams. Initial cyanide concentrations ranged from 11,400 mg/L to 56,000 mg/L. In each case, rapid degradation if cyanide occurred; achieving effective removal of cyanide within three days for the copper/cadmium-plating wastewater, and 99.9% cyanide removal within two days for the copper/nickel plating wastewater.

* Please note that the above prices are ex-works, exclude GST are indicative only and subject to change without notice.

Solubility of Some Metal Sulphides vs. Metal Hydroxides vs. pH