

Environmentally friendly heavy metal removal from wastewater with AC-TMT[®]15

The challenge of heavy metals in wastewater, characterised by their high density (typically > 3.5 – 5 g/cm³), are inherent in various industrial sectors and applications. However, these metals pose severe threats to both human health and the environment due to their inherent toxicity. As a result, stringent environmental regulations are often in place to restrict their presence in wastewater and exhaust emissions. To comply with these regulations, wastewater is commonly treated with caustic soda solution or lime to neutralise it. This process aims to precipitate heavy metals as insoluble hydroxides, enabling their removal. Unfortunately, this method often encounters difficulties caused by the presence of complexing agents, which hinder or entirely prevent the hydroxide precipitation process. The outcome is an inability to meet the required limits for heavy metal concentration.

Effective heavy metal precipitation, AC-TMT[®]15, offers a solution to this challenge by reacting with heavy metals to create highly stable, virtually insoluble compounds of heavy metal-TMT. These compounds form solid precipitates that are easily separable. Notably, AC-TMT[®]15 delivers reliable results even when hydroxide precipitation proves ineffective or minimally effective. Consequently, this innovative approach enables industries to achieve the necessary compliance with heavy metal concentration limits.

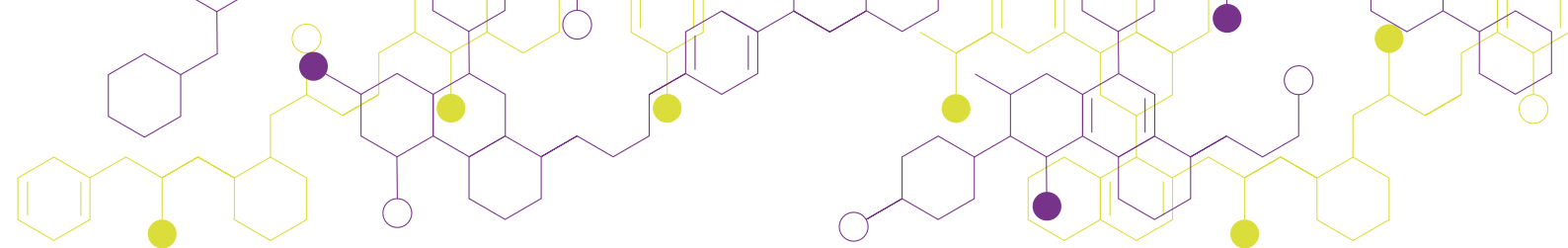
AC-TMT[®]15 is produced by Algol Chemicals in the Nordic countries.

ADDITIONAL INFORMATION

- Heavy metals, characterised by their high density, are natural elements that are resistant to degradation or destruction. They can only undergo changes in their chemical and physical properties, such as forming soluble or insoluble compounds.
- Complexing agents are substances capable of maintaining metals in a dissolved state.

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APPLICATIONS OF AC-TMT®15

1. WASTE INCINERATION/THERMAL UTILISATION:

Heavy metals are released in incineration processes that burn municipal and industrial waste. High combustion temperatures lead to the transfer of heavy metals into flue gases, particularly the volatile ones like mercury and cadmium. While purification methods like flue gas scrubbing effectively remove these hazardous substances, they generate substantial amounts of scrubber water highly contaminated with heavy metals.

2. COAL-FIRED POWER STATIONS:

Coal contains small quantities of toxic heavy metals, which are released during combustion. The conventional desulphurisation processes in coal-fired power plants result in resaleable gypsum and polluted wastewater.

3. PLATING AND SURFACE FINISHING:

Industries employing processes such as electroplating and circuit board production often use solutions containing heavy metals. These processes generate wastewater and use process solutions that vary significantly in heavy metal complex concentrations.



ADVANTAGES OF AC-TMT®15

1. EFFICIENCY:

AC-TMT®15 operates effectively within a wide pH range, both in alkaline and acidic environments. It seamlessly integrates into existing wastewater treatment plants, avoiding costly secondary treatments. The thermally stable heavy metal-TMT compounds are suitable for spray-drying processes.

2. SAFETY:

AC-TMT®15 is a ready-to-use solution that is safe to store, producing no decomposition products and featuring no odor or hazardous substances.

3. ENVIRONMENTAL FRIENDLINESS:

It boasts favorable toxicological and ecological characteristics, creating compounds that are challenging to leach and safe for landfill disposal.

PRODUCT DESCRIPTION

AC-TMT®15 is a ready-to-use 15% aqueous solution of trimercapto-s-triazine, trisodium salt - an organosulfide serving as the active agent. It effectively precipitates monovalent and bivalent heavy metals from wastewater, including cadmium, copper, lead, mercury, nickel, and silver, even in the presence of complexing agents that hinder hydroxide precipitation. AC-TMT®15 is available in canisters, containers (IBC), or bulk deliveries.

BENEFITS FOR VARIOUS APPLICATIONS

BENEFITS IN COMBUSTION PLANTS

- AC-TMT®15, when added in small quantities to scrubber water treatment plants, ensures the precipitation of complexed mercury and cadmium for removal.
- Combining hydroxide precipitation with AC-TMT®15 offers a cost-effective approach to plant operation.
- It helps maintain heavy metal concentration thresholds in wastewater, sometimes even exceeding drinkable quality requirements.
- The use of AC-TMT®15 in alkaline scrubbers reduces mercury emissions in clean gas without the need for expensive plant retrofitting.
- Spray drying can be employed to separate thermally stable heavy metal-TMT compounds.

BENEFITS IN SURFACE TREATMENT

- AC-TMT®15 offers versatile applications suitable for addressing the complex wastewater matrix in this industry.
- It remains effective when hydroxide precipitation proves minimally effective or ineffective.
- AC-TMT®15 is safe to handle across a wide pH range.
- Integration into batch and continuous processes is straightforward.
- The resulting metal-TMT compounds can be recycled or safely disposed of.

PRECIPITATION AGENTS / QUALITY

	Sodium sulphide	Sodium thiocarbonate	Dimethyldithiocarbamate	Trimercaptotriazine
CAS-RN	1313-82-2	128578-22-3	128-04-1	17766-26-2
Commodity	60% solid	solution	42% solution	15% solution
Acute toxicity, LD ₅₀ (rat, mg/kg)	208	n.a.	3,590	7 878
Lethal conc. LC (fish, mg/l)	25 (LC ₅₀)*	55 (LC ₅₀)*	20 (LC ₅₀)*	12 000 (LC ₀)**
Mutagenity	n.a.	n.a.	yes	no
Products of decomposition	H ₂ S	H ₂ S + CS ₂	CS ₂	none

* (LC50) = Concentration where 50% of the fishes die.

** (LC0) = Concentration where no fish dies.

n.a. = not available.

Right Chemistry - Always

