

# TMT 15<sup>®</sup>

Environmentally friendly separation  
of heavy metals from wastewater





Environmentally friendly separation of heavy metals from wastewater

The problem:  
**heavy metals in  
wastewater**

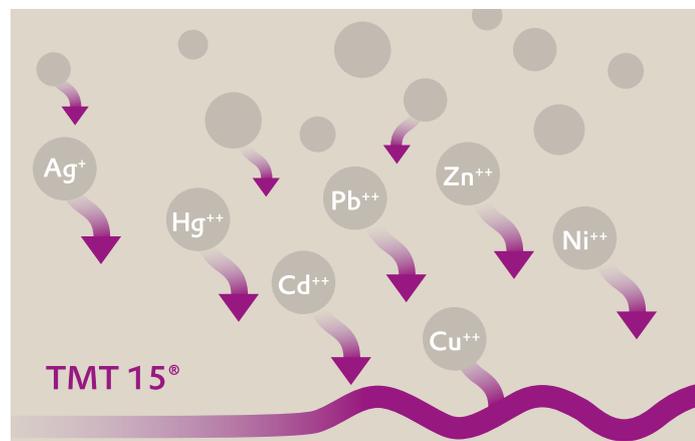
Use of heavy metals<sup>1)</sup> is unavoidable in numerous branches of industry and industrial applications. Because heavy metals are usually extremely toxic to man and environment alike, strict environmental regulations are often enforced to limit their concentration in wastewater (and exhaust air). In order to comply with these regulations, the wastewater is usually neutralized with caustic soda solution or lime. The heavy metals precipitate as insoluble hydroxides and can thus be removed. However, these methods frequently fail, due to the presence of complexing agents<sup>2)</sup> that interfere with the precipitation of hydroxides, or even completely prevent it.

**The result: heavy metal limits cannot be achieved.**

The solution:  
**precipitation with  
TMT 15®**

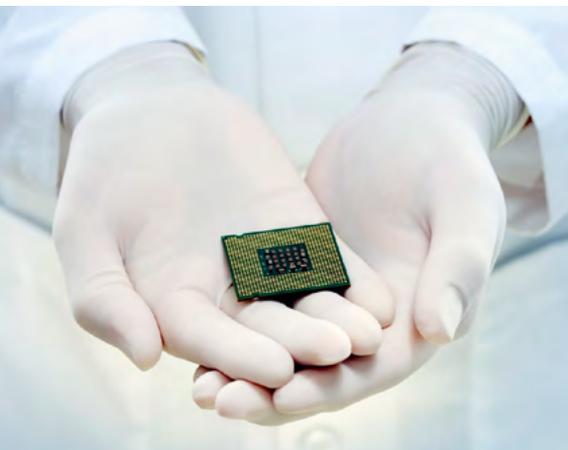
**TMT 15®** reacts with heavy metals to form extremely stable, virtually insoluble heavy metal-TMT compounds. It forms a solid that is easy to separate. **TMT 15®** also produces good results when hydroxide precipitation exhibits little or no effect.

**The result: heavy metal limits can be achieved.**



<sup>1)</sup> Heavy metals are defined as metals with a high density (> 3,5 – 5 g/cm<sup>3</sup>). They are natural elements that can't be degraded or destroyed. Only their chemical and physical properties can change (such as by forming soluble or insoluble compounds).

<sup>2)</sup> Complexing agents are substances that are capable of keeping metals in solution.



The branches:  
applications of TMT 15®

**Waste incineration/thermal utilization**

Heavy metals are present in incinerators that burn municipal and industrial wastes. The high combustion temperatures cause heavy metals to be transferred to the flue gas, especially the heavy metals which are easily volatile (e. g. mercury and cadmium). Purification measures, such as flue gas scrubbing, will remove these and other hazardous substances. However, they generate large quantities of scrubber water that is highly contaminated with heavy metals.

**Coal-fired power stations**

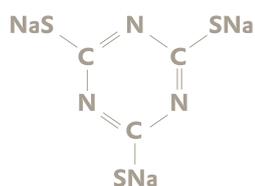
In addition to sulfur, coal contains small quantities of toxic heavy metals that are released during combustion. Resaleable gypsum and polluted wastewater result from the processes which coal-fired power plants conventionally use to desulfurize flue gas.

**Plating and surface finishing**

Many processes, such as electroplating and circuit board production, require the use of solutions, which contain heavy metals. Such processes generate wastewater and used process solutions containing heavy metals. The extensive variation in the wastewater matrix poses a special problem in this branch of industry: heavy metals, which are bound in complexes can be present in extremely different concentrations.



## The product



**TMT 15°** is a ready-to-use 15 % aqueous solution of trimercapto-s-triazine, trisodium salt, an organosulfide that represents the active agent.

**TMT 15°** is used to precipitate monovalent and bivalent heavy metals from wastewater (including cadmium, copper, lead, mercury, nickel and silver) that are dissolved and bound in complexes. It can be used effectively even where the complexing agent prevent these metals from precipitating as hydroxides.

**TMT 15°** is delivered in canisters, containers (IBC) or bulk deliveries.

**TMT 15°** is available worldwide through the marketing network of Evonik.

## The advantages

### TMT 15° has been proven

- Has been successfully used in different branches of industry
- Successfully used worldwide in hundreds of incinerators (state of the art)

### TMT 15° is efficient

- Effective over a wide pH-range, in both alkaline and acidic environments
- Easy and inexpensive to integrate into existing wastewater treatment plants
- Avoids expensive secondary treatments
- The thermally stable heavy metal-TMT compounds are suitable for spray-drying processes

### TMT 15° is safe to handle

- Ready-to-use solution that is safe to store
- No decomposition products
- Odorless
- No dangerous substances

### TMT 15° is environmentally friendly

- Favorable toxicological and ecological characteristics
- Forms compounds that are difficult to elute and safe to dump in landfills



The benefit:  
**reliable maintenance  
of the threshold values**

**The benefits to combustion plants**

- The addition of small quantities of **TMT 15®** into the scrubber water treatment plant will ensure that complexed mercury and cadmium will precipitate so that they can be removed.
- The combined use of hydroxide precipitation and **TMT 15®** is a particularly low-cost method of operating treatment plants.
- The threshold values for heavy metals in wastewater can be maintained. Sometimes these values even lie below the requirements for drinkable quality.
- Using **TMT 15®** in alkaline scrubbers to reduce mercury emissions in the clean gas obviates the need for expensive plant retrofitting.
- Spray drying can be used to separate the thermally stable heavy metal-TMT compounds.

**The benefits to surface treatment**

- The many ways that **TMT 15®** can be used meets the challenges of the complex wastewater matrix in this branch.
- It will work even when hydroxide precipitation shows little or no effect.
- Safe to handle over a wide pH-range.
- Easy to integrate into both batch and continuous processes.
- Metal-TMT compounds can be recycled or safely dumped.



## More facts about TMT 15®

Further information about **TMT 15®** and its versatile applications can be downloaded from our website: [www.evonik.com/tmt15](http://www.evonik.com/tmt15)

### **Product brochures**

#### **Product information**

- Toxicology/Ecology/Properties of Precipitation products
- Material resistance

#### **Application information**

- Frequently asked questions
- Use in flue gas scrubbers from incineration plants

#### **Analytical procedures**

- Determination of **TMT 15®** concentration
- **TMT 15®** determination in wastewater

#### **Case studies e. g.**

- Precipitating mercury from flue gas scrub water
- Precipitating copper from wastewater resulting from printed circuit board manufacture

#### **Material safety data sheets**

#### **Optimal TMT 15® dosing requirements**

#### **References/presentations**

We will be happy to send these documents upon request.

**Disclaimer**

This information is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party patent rights. In particular, this information neither contains any warranties or representations. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Reference to trademarks used by other companies is neither a recommendation, nor is it intended to suggest that similar products could not be used. All our business transactions shall exclusively be governed by our General Sales Conditions.



**EVONIK**  
INDUSTRIES

**Evonik Performance  
Materials GmbH**

Marketing and sales  
Rodenbacher Chaussee 4  
63457 Hanau  
Germany

PHONE +49 6181 59-4107  
FAX +49 6181 59-74107  
tmt@evonik.com  
www.evonik.com/tmt15

**Evonik Performance  
Materials GmbH**

Application and technology  
Rodenbacher Chaussee 4  
63457 Hanau  
Germany

PHONE +49 6181 59-2854  
FAX +49 6181 59-4266  
tmt@evonik.com  
www.evonik.com/tmt15

**Evonik. Power to create.**