




RE300
RARE EARTH TECHNOLOGY

**Introducing
a better way
to remove
phosphorus**

neo

Performance Materials

The background of the image is a photograph of a water treatment facility. The top half shows a large, curved structure with many vertical channels, likely a trickling filter or a similar biological treatment stage, with water cascading over it. The bottom half shows a close-up of a row of vertical pipes or diffusers, with water being distributed into a tank below. The overall scene is industrial and focused on water purification.

RE300 can deliver very high rates of phosphorus removal from wastewater. Levels of less than 0.07 mg/l can be achieved without the use of ultra-filtration.



RE300 is a rare earth salt solution developed specially for rapid and stable precipitation of phosphorus in municipal and industrial wastewater facilities.

The product can be applied in primary, secondary, and tertiary treatment, and has successfully removed phosphorus in trickling filters, rotating bed contactors, sequencing batch reactors, clarifiers, and media filters.

RE300's targeted reaction with phosphorus greatly reduces the amount of product needed to achieve the desired final phosphorus level in the plant effluent waste stream. As a result, less chemical sludge is generated in the treatment process.

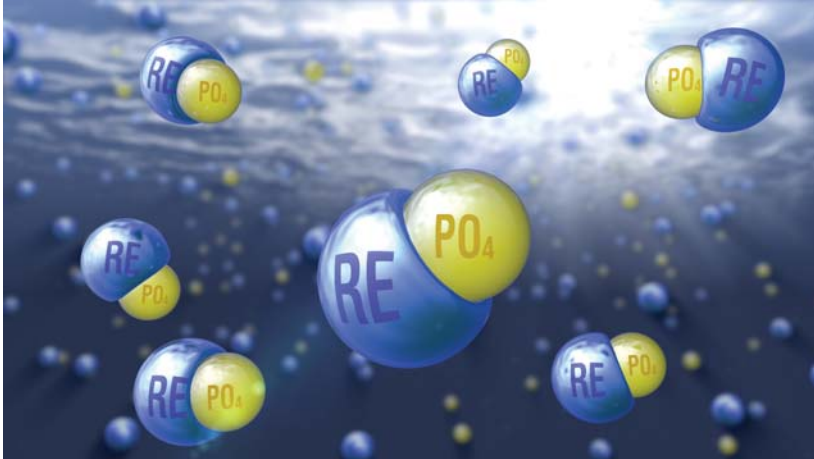
Municipal plants using RE300 have repeatedly passed whole effluent toxicity testing at 100% effluent concentration.

How RE300 Works

RE300 works differently – and much more efficiently – than traditional water treatment chemicals like ferric chloride or aluminum chloride. RE300 preferentially reacts with phosphorus to form a strong crystalline ionic bond with phosphorus, creating an insoluble precipitate: $\text{REPO}_4 \cdot \text{H}_2\text{O}$ (Rhabdophane). RE300 achieves phosphorus removal at a 1:1 molar ratio of RE:PO₄.

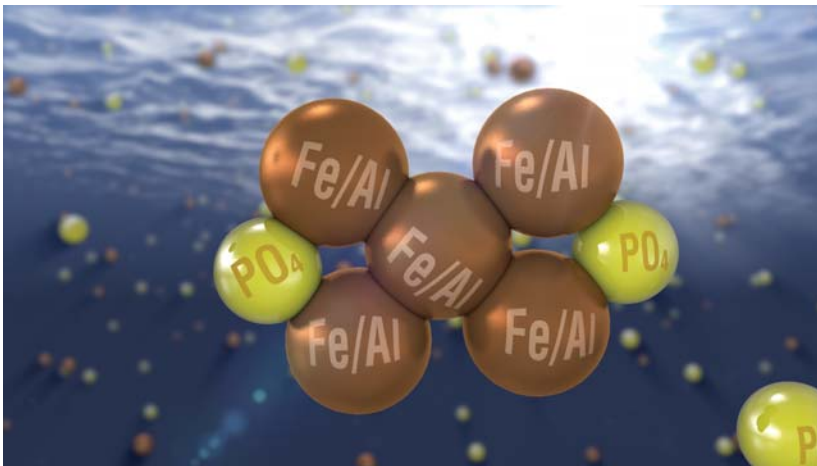
In contrast, traditional metal salts like ferric chloride or aluminum chloride do not bind to phosphorus very efficiently or very tightly. They form M^+OOH and $\text{M}^+(\text{OH})_3$ intermediates, to which phosphate adsorbs to the surface. This is a function of surface chemistry, instead of a strong ionic bond. Phosphorus removal occurs at approximately a 5:2 ratio of Fe/Al to P, which is why it takes relatively large amounts of Fe/Al to reduce phosphorus to desired levels.

Because RE300 removes phosphorus more efficiently, much less of the product is needed to obtain excellent phosphorus removal results



RE300 binds tightly to phosphorus through a strong crystalline ionic bond, and achieves removal at a 1:1 molar ratio of RE:PO₄. As a result, much less RE300 is needed than traditional metal salts to obtain excellent phosphorus removal.

Traditional Metal Salts



Ferric or aluminum chloride form $M+OOH$ and $M+(OH)_3$ intermediates, to which phosphate adsorbs to the surface. Phosphorus removal occurs at approximately a 5:2 ratio of Fe/Al to P, so it takes larger amounts of Fe/Al to reduce P to desired levels.

Extensive wastewater treatment plant trials have proven the following benefits of using RE300:

- Achieves < 0.07 ppm-P with no added capital equipment such as tertiary filters.
- Improves dewatering in filter presses and centrifuges.
- Reduces sludge volume due to less chemical contribution to sludge.
- Improves clarifier solids coagulation.
- Eliminates the need for heated storage and pipe tracing due to its -40°F freezing point.
- Enables plants to meet low phosphorus discharge levels while avoiding increased aluminum release.
- Inhibits struvite build-up.
- Is non-hazardous and safer to work with than iron- and aluminum-based products.
- Can be applied in primary, secondary, and tertiary treatment, and has successfully removed phosphorus in trickling filters, rotating bed contactors, sequencing batch reactors, clarifiers, and media filters.
- Municipal plants using RE300 have repeatedly passed whole effluent toxicity testing at 100% effluent concentration.
- Product is available in bulk tanker trucks and 275-gallon totes containing 1,500kg of solution.



RE300 helps wastewater facilities achieve greater water clarity than competing products, as well as faster coagulation, improved sludge dewatering, better digester performance, and no staining or discoloration of facility structures.



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8101 E. Prentice Avenue, Suite 525
Greenwood Village, CO 80111
+1 (303) 843-8065

Sales Contacts

Southern U.S.

Jim Gallmann
j.gallmann@neomaterials.com
(303) 218-0239

Midwest U.S.

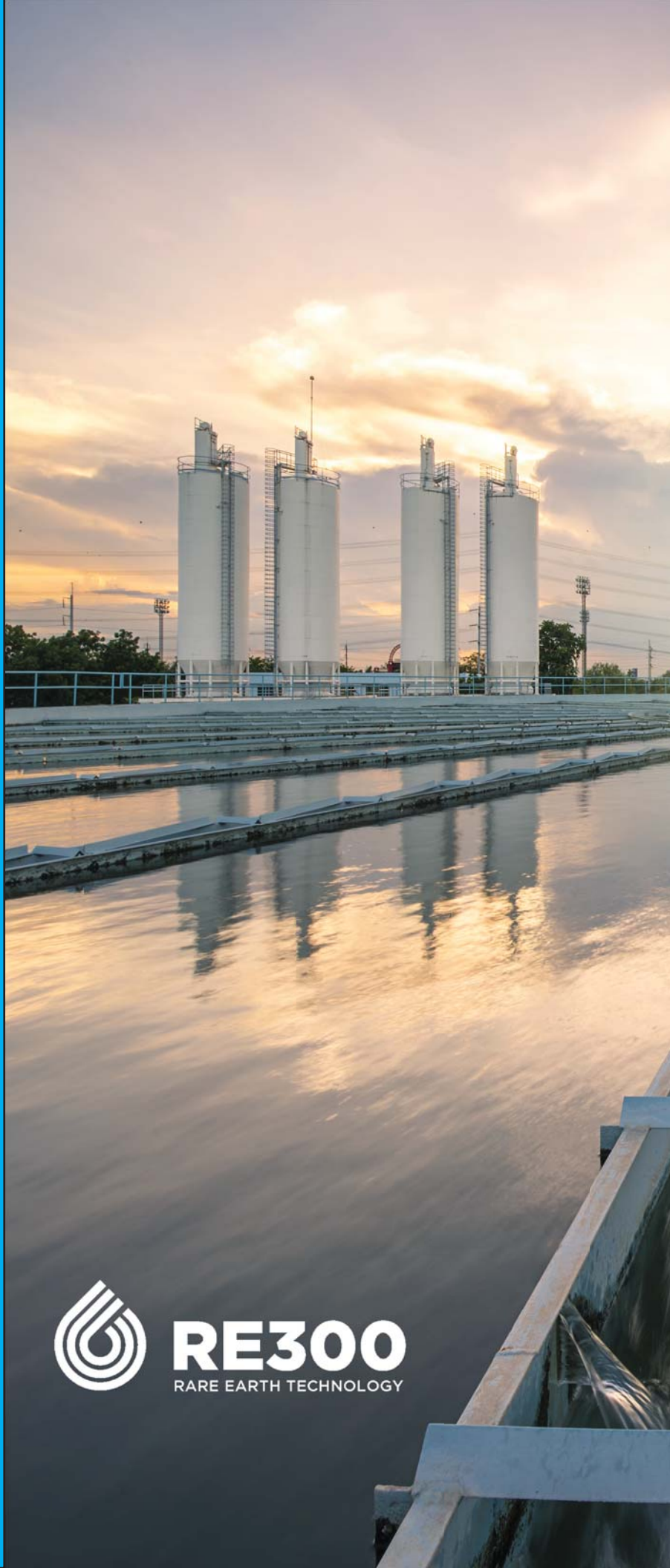
Pam Cornish
p.cornish@neomaterials.com
(734) 216-2089

Eastern U.S.

Bill Pettit
b.pettit@neomaterials.com
(724) 309-9720

Western U.S.

Jason Hock
j.hock@neomaterials.com
(346) 225-1605



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