

# PHOSPHORUS REMOVAL

## Advanced Phosphorus Removal

Blue Water Technologies, Inc. is the industry leader in the development of technologies for phosphorus removal from wastewater. With advanced control techniques and patented nutrient removal systems, Blue Water can provide you with a cost effective solution to meet your phosphorus level needs.

The Blue PRO® system provides a unique approach to chemical dosing, with significantly lower chemical use across the entire wastewater treatment plant than competitors. No other chemical dosing is required in the plant to achieve the lowest phosphorus discharge requirements. Current Blue PRO® installations are meeting permit limits as low as 0.05 mg/L with a chemical dose of only 10 mg/L as Fe. Blue Water's unique chemical control system provides an advantage due to its cost efficiency and ability to seamlessly integrate into and respond to the needs of existing wastewater treatment systems. The chemical dose used with Blue PRO® methods is so much lower than the competition that the comparative savings represent a return on the capital investment in less than three years.

The Blue PRO® process is the leading technology for phosphorus reduction to any level. Whether the targeted phosphorus discharge limit is 10 mg/L P or as low as 0.01 mg/L P, Blue PRO® methods provide reductions in chemical usage, equipment footprint, and associated operations and maintenance costs over alternative technologies. The Blue PRO® platform is the most effective and most inexpensive tertiary treatment solution where additional considerations are needed, such as denitrification or metals removal.



A Blue PRO® installation in Grangeville, Idaho for 0.05 mg/L phosphorus

# Blue PRO®

## The Blue PRO® System

How does the Blue PRO® process work? Using Blue Water's Centra-flo® continuous backwash gravity sand filters, a unique control system, and the patented Blue PRO® process for reactive filtration, phosphorus is removed from wastewater streams through an array of mechanisms. Most importantly, Blue PRO® systems optimize adsorption.

Blue Water's reactive filtration process overcomes a critical obstacle to achieving efficient phosphorus removal in bulk aqueous solutions by providing reactive surface sites within the media bed, resulting in forced contact of chemical species with high adsorptive capacity. The adsorptive surface in Blue PRO® filters is a continuously regenerated hydrous ferric oxide (HFO) coating that forms on the surface of the sand media. Coagulation followed by filtration simply cannot compare to the efficiency of adsorptive phosphorus removal.

Waste HFO, phosphorus, and solids are removed from the filter through the backwash or reject stream. Recycling this reject upstream provides the added benefit of removing phosphorus in plant clarification systems, further guaranteeing the achievement of the discharge phosphorus target as well as lowering the chemical dose. The phosphorus is chemically bound, leaving the plant with the sludge, rather than releasing in effluent streams or digestion. Integration of Blue Water's phosphorus removal technology does not require change in the plant's sludge handling system. The Blue PRO® system uses over 30% less chemical than other technologies, therefore producing less sludge. The waste HFO also helps with odor control and can reduce water content in biosolids.

### Blue PRO® Applications:

- **Advanced total phosphorus removal**
- **Metals removal, including mercury**
- **Combined denitrification**
- **Algae mitigation**

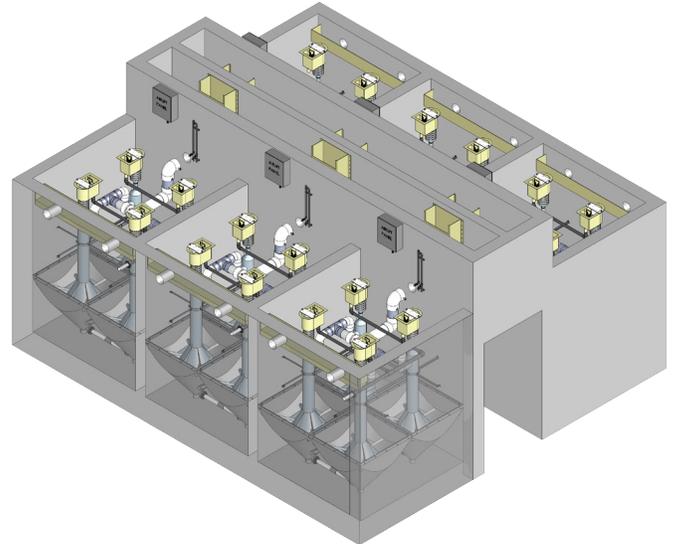


The Blue PRO® system is available in several models and configurations. The modular nature of the filters allows for easy system expansion. The filters are available as freestanding fiberglass or stainless steel units or as in-ground concrete cells. Control systems and smaller filters may be skid mounted for mobility or ease of commissioning.

**Additional Features**

Since many plants requiring phosphorus mitigation also require nitrogen control, Blue Water provides the option to simultaneously denitrify in the same vessel with the Blue PRO® process. With slight modifications, Blue Water can provide a unique and efficient system for total nutrient reduction.

Besides phosphorus, Blue PRO® methods are effective at removing many other contaminants, such as mercury, arsenic, chromium, and uranium. Minor adjustments in water chemistry may be implemented for the removal of metals and other contaminants, including zinc, lead, copper, iron, and manganese. Blue Water has installations for removal of these contaminants in wastewater plants as well as groundwater systems, including self-contained package treatment systems.



4.3 MGD Blue PRO® system design for 0.07 mg/L TP in a Massachusetts WWTP

INFLUENT → + CHEMICAL →



Blue Water's Blue PRO® technology is covered by multiple patents and patents pending.

**The Blue PRO® Advantages:**

- Low capital and O&M costs
- Continuous flow – no interruption for backwash or changing media
- Modular design easily handles capacity increases
- Simple operation & low chemical use

