

## Application Brief

## WASTEWATER TREATMENT

To comply with local regulations, solids and organic matter must be removed before wastewater can be safely discharged from an industrial plant to a body of water or publicly owned treatment works (POTW). Generally, solids and organic matter extracted from wastewater streams, commonly known as “sludge,” are sent offsite for disposal or reuse. Water is removed from the sludge to reduce downstream processing or transportation costs.

The appropriate blend of coagulants and flocculants aids in removing suspended solids, impurities, and turbidity from water sources to prepare them for discharge. These operations enhance the downstream operation of sludge dewatering. Given the highly variable nature of wastewater, it requires a unique combination of products and expertise to ensure smooth, reliable, and cost-effective operations.

## Your Pain Points

**Coagulation and flocculation** are two distinct reactions of the physio-chemical treatment of wastewater. Impurities in water are in the form of tiny particles called colloids, which form stable dispersions that impart color, impurities, turbidity, and other undesirable inclusions in water. It is imperative to remove these impurities from water to meet discharge compliance.

**Coagulation** is the first step in eliminating colloidal particles, and its primary function is to destabilize these dispersions. This destabilization is the neutralization of the electrical charge on the particle's surface, thus facilitating the agglomeration of these particles.

Cationic coagulants neutralize the negative charge of colloids and form a spongy mass called microflocs.

**Flocculation** is the second step, wherein the destabilized colloidal particles that form during the coagulation are chemically encouraged to aggregate. With their very high molecular weights and charge content, flocculants fix the destabilized particles and aggregates along the polymer chain, increasing the particles' size and resulting in rapid sedimentation and separation of these impurities.

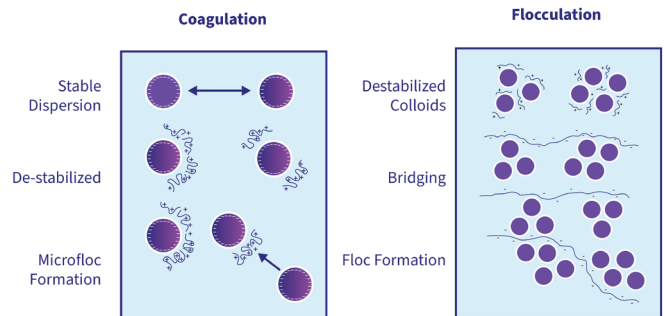


Figure 1: Coagulation and Flocculation

With effective coagulation and flocculation, the water can be decanted or filtered to reach the desired quality of water treatment or dryer sludge from dewatering operations.

## Our Comprehensive Solution

Gradient offers a comprehensive approach to address these challenges, integrating advanced chemical treatment with sophisticated feed, monitoring, and control systems. Our tailored programs provide peace of mind for all wastewater applications, ensuring safe, reliable, and efficient operations.

By combining our application expertise and suite of high-performance CURE chemicals, we can tailor the optimal combination to your plant's unique operating needs:

- Coagulants - facilitating the effective agglomeration of suspended particles, allowing for the separation of solids
- Flocculants - promoting the aggregation of destabilized particles into larger, easily removable masses, enhancing solids separation for improved water quality and reduced water content in sludge
- Bioaugmentation - introducing specialized microorganisms to enhance biological processes, accelerating the breakdown of organic pollutants, reducing sludge production, and promoting overall wastewater treatment efficiency

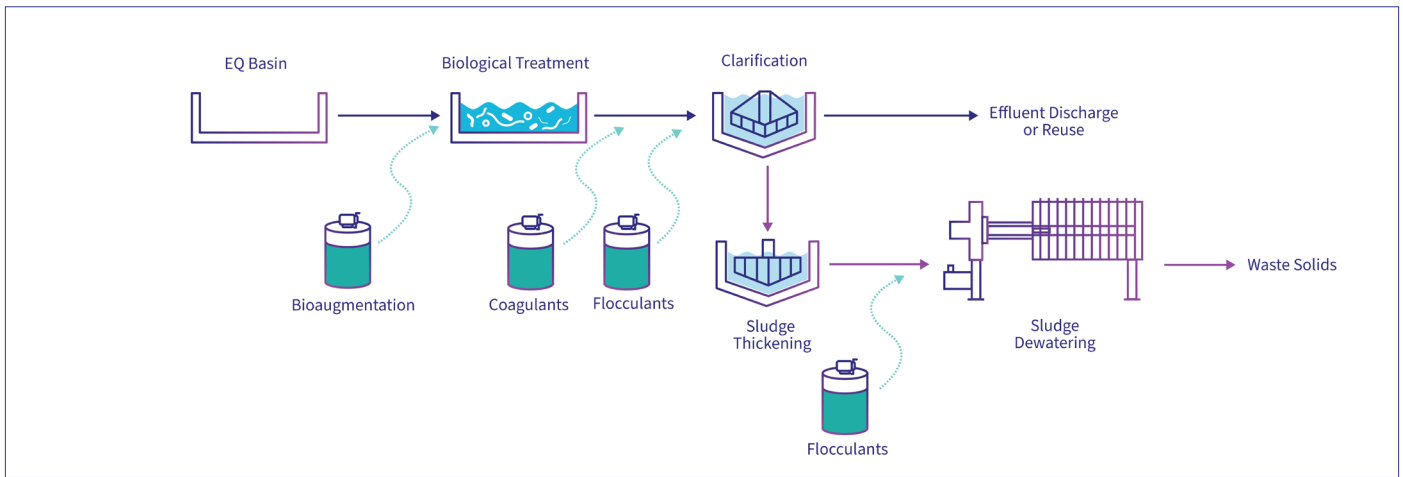


Figure 2: CURE Chemicals in Wastewater Treatment

## Bespoke Service Programs

Gradiant designs customized service programs aligned with each facility’s needs. These include routine water chemistry analyses, chemical inventory checks, system performance monitoring, training, technical support, and on-site response. Chemical dosing systems are integrated into the comprehensive chemical and service program.

## Benefits

Ensure discharge compliance, reduce costs, and enhance your sustainability profile —Gradiant’s tailored solutions redefine the potential of your wastewater systems.



### Ensured Compliance

Effective chemical solutions are crucial in meeting stringent discharge standards and ensuring compliance with regulatory requirements, which helps eliminate fees and reputational risk from non-compliance.



### Reduced Costs

Tailored programs improve contaminant removal from wastewater systems, saving on discharge fees associated with total suspended solids (TSS) and biological/chemical oxygen demand (BOD/COD). Additionally, dryer sludge reduces downstream processing and transportation costs by up to 20%.



### Enhanced Sustainability

Optimized wastewater treatment is the foundation of a sustainable operation. Consistently delivering high-quality effluent allows a site to reclaim this valuable resource for beneficial reuse and improves sludge solids, saves energy, and reduces CO<sub>2</sub> emissions on downstream processing and transportation.

Learn more about Gradiant’s water treatment expertise across your facility:

- [Technologies](#)
- [Solutions & Industries](#)
- [CURE Chemicals:](#)
  - Water Clarification Systems
  - Membrane Systems
  - Wastewater Treatment
  - Cooling Systems
  - Process Treatment
  - Boiler Systems

Have a question? Contact us at:  
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