

Application Brief

WATER CLARIFICATION

If a municipal water source is unavailable, an alternate source, such as groundwater or surface water, must be used. Frequently, this water requires an initial process consisting of a clarifier or multi-media filtration system.

Coagulants and flocculants are employed to remove suspended solids, impurities, and turbidity, ensuring the water satisfies general site quality requirements. These chemicals are pivotal in delivering high-quality water for drinking or industrial processes while reducing the burden on downstream treatment systems, such as membrane systems, that provide higher-quality water for more specialized processes.

Your Pain Points

Several factors can compromise the efficiency and effectiveness of the water clarification process. One primary challenge is the presence of particles of varying sizes and compositions, and effective removal becomes complex when dealing with these heterogeneous suspensions. Additionally, variations in physical and chemical parameters, such as pH fluctuations and the presence of organic matter, can hinder the performance of conventional clarification methods. The potential for the formation of difficult-to-treat colloidal material and the risk of microbial growth further contribute to operational challenges. These complexities underscore the need for advanced and targeted solutions to address the unique challenges water clarification poses.

Coagulation and flocculation are two very distinct reactions in the physio-chemical treatment of water. 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 prepare it for industrial or potable use.

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, where destabilized colloidal particles formed during the coagulation step assemble into aggregates. 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.

With effective coagulation and flocculation, the water is decanted or filtered to reach the desired treated water quality.

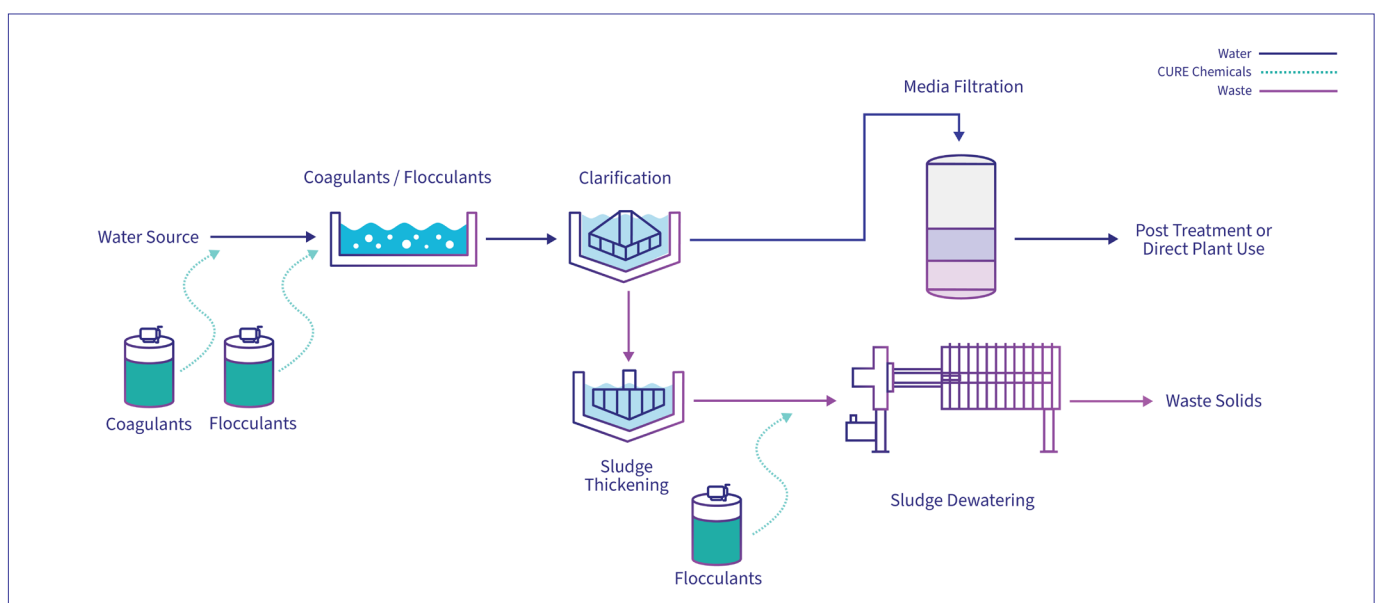


Figure 1: CURE Chemicals in Water Treatment

Our Comprehensive Solution

Gradiant 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 water clarification 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 more efficient filtration operations

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.

Have a question? Contact us at:
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Benefits

Enhance the quality in your process, increase production, reduce operating costs — Gradiant's tailored solutions redefine the potential of your water clarification systems.



Improved Quality

The output quality of process water is critical to ensure smooth operations, quality products, and reduced downstream plant operations. For example, it can eliminate the need for membrane systems to remove suspended and dissolved solids or color bodies. Equally, better-quality treated water will positively impact the process and overall product quality.



Reduced Costs

Proper coagulation and flocculation ensure good sedimentation. The more effective the solids removal in this step, the lower the load on downstream filtration, allowing for more efficient and effective operations. Specifically, less frequent backwashes translate into lower energy costs for blowers, which directly lowers operational costs.



Increased Production

Process output is directly indexed and related to the effectiveness of water treatment operations. When sedimentation performs at its peak and the plant executes less frequent backwashes, the filtration system experiences more time for water production.

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