



Coagulant - PolyDADMAC

Application of PolyDADMAC

PolyDADMAC (polydiallyldimethylammonium chloride) is a strongly cationic, water-soluble polymer widely used as a primary coagulant or coagulation aid in water treatment and industrial separation processes. Due to its very high charge density, low molecular weight compared with flocculants, fast reaction speed, and excellent solubility, PolyDADMAC plays a critical role in drinking water treatment, municipal and industrial wastewater treatment, sludge conditioning, clarification systems, and industrial process water applications.

Coagulation Mechanism of PolyDADMAC

The main function of PolyDADMAC is charge neutralization. Most suspended solids, colloidal particles, organic matter, algae, and emulsified oils present in water carry a negative surface charge, which keeps them dispersed and stable.

PolyDADMAC contains a permanent quaternary ammonium cationic structure along its polymer backbone. When added to water, it rapidly neutralizes the negative charges on particle surfaces, destabilizing colloids and allowing particles to collide and aggregate into microflocs. These microflocs can then be removed by sedimentation, flotation, filtration, or subsequent flocculation using high-molecular-weight polymers. Unlike inorganic coagulants, PolyDADMAC does not rely on hydrolysis reactions, ensuring consistent performance over a wide pH range.

Application in Drinking Water Treatment

One of the most important applications of PolyDADMAC is in municipal drinking water treatment plants. Raw water sources such as rivers, lakes, and reservoirs often contain turbidity, fine clay particles, algae, bacteria, and natural organic matter. PolyDADMAC is commonly used as a primary organic coagulant or as a coagulant aid in combination with aluminum sulfate or ferric salts. Its fast coagulation kinetics improve floc formation, enhance sedimentation efficiency, and significantly reduce turbidity and color. Compared with metal-based coagulants, PolyDADMAC produces less sludge, consumes minimal alkalinity, and leaves no residual aluminum or iron, contributing to improved finished water quality.

Municipal Wastewater Treatment Applications

In municipal wastewater treatment, PolyDADMAC is widely applied in primary clarification to improve suspended solids and organic matter removal. Enhanced primary clarification reduces the hydraulic and organic loading on downstream biological treatment processes, improving overall plant efficiency.

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PolyDADMAC is also used for stormwater treatment and combined sewer overflow (CSO) management, where rapid reaction and reliable coagulation are essential due to short retention times. Its ability to quickly destabilize fine solids makes it particularly suitable for high-flow and variable wastewater conditions.

Industrial Wastewater and Effluent Treatment

PolyDADMAC plays a vital role in industrial wastewater treatment, especially in industries such as oil and gas, petrochemical processing, textile dyeing, food and beverage production, chemical manufacturing, pulp and paper, and metal finishing.

Industrial effluents often contain emulsified oils, surfactants, dyes, and colloidal solids, which are difficult to remove using conventional treatment chemicals. PolyDADMAC is highly effective at breaking emulsions, reducing turbidity, and removing fine suspended solids. It is frequently applied ahead of dissolved air flotation (DAF) units, clarifiers, or membrane systems to improve solids capture and protect downstream equipment.

Sludge Conditioning and Dewatering Enhancement

Another important application of PolyDADMAC is sludge conditioning prior to mechanical dewatering. Sludge particles typically possess strong negative surface charges that hinder aggregation and water release.

PolyDADMAC is often used as a pre-coagulant before the addition of cationic polyacrylamide flocculants. By neutralizing surface charges, PolyDADMAC improves floc formation and allows flocculants to build stronger and more compact flocs. This results in lower polymer consumption, clearer filtrate, higher cake solids, and more stable dewatering performance in centrifuges, belt filter presses, screw presses, and filter presses.

Clarification and Process Water Treatment

PolyDADMAC is widely used in industrial process water treatment to remove turbidity, colloidal silica, and fine suspended solids. Typical applications include cooling water makeup, boiler feed pretreatment, mining process water, and power plant wastewater. By improving clarification efficiency, PolyDADMAC helps protect filters, membranes, heat exchangers, and ion-exchange systems from fouling. Its rapid action makes it particularly suitable for compact treatment systems with limited contact time.

Pulp and Paper Industry Applications

In the pulp and paper industry, PolyDADMAC is used as a fixing agent and wet-end process chemical. Modern papermaking systems, especially those using recycled fiber, generate significant levels of anionic trash, which negatively affects retention, drainage, and paper quality.

PolyDADMAC neutralizes these anionic contaminants, improving fines and filler retention, enhancing drainage, and stabilizing wet-end chemistry. This leads to improved machine runnability, better sheet formation, higher productivity, and reduced overall chemical consumption.

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In summary, PolyDADMAC is a highly efficient and versatile cationic coagulant with broad applications in drinking water treatment, municipal and industrial wastewater treatment, sludge conditioning, clarification systems, process water treatment, and pulp and paper manufacturing. Its high charge density, fast reaction speed, low sludge production, and excellent compatibility with other treatment chemicals make PolyDADMAC an essential component in modern water treatment programs. As water quality requirements become increasingly stringent, PolyDADMAC continues to deliver reliable, cost-effective, and sustainable treatment performance.

Most Popular Specifications for Water Treatment:

Product Type	Model Name	Monomer Type	Total Solids %	Brookfield Viscosity
Coagulants	Polydadmac-5020	DADMAC	20%	1000-3000
	Polydadmac-2935	DADMAC	35%	10000-20000
	Polydadmac-2540	DADMAC	40%	8000-12000
	Polydadmac-2050	DADMAC	50%	8000-12000
	Polydadmac-3330	DADMAC	30%	200-1000
	Polydadmac-2040	EPIDMA	40%	1600-2900
	Polydadmac-2050	EPIDMA	50%	200-9000
	Polydadmac-2065	EPIDMA	65%	1000-3000