

# TRAMFLOC, INC.

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## Technical Information Bulletin

### TRAMFLOC® 734 Cationic Coagulant

#### 1. Description of DADMAC

Formula:  $C_8H_{16}NCl$

CAS NO: 7398-69-8

Chemical family: quaternary ammonium chloride aqueous solution.

structural formula:

Physical properties: boiling point=100°C; Density: (25° C)=1.04

Solubility: soluble in water; pH= 6~8

Appearance: colorless or straw-yellow, viscous liquid; Odor: amine

#### 2. Properties:

This polyDADMAC formulation is a high purity, quaternary ammonium salt monomer of water-soluble, high efficiency, positively charged ions. Molecular formula  $C_8H_{16}NCl$ , molecular weight 161.5. Its molecular structure contains alkyl double bonds, which may form linear homopolymer and various kinds of copolymer through various kinds of polymer reactions. Features of polyDADMAC are that under normal temperature, it is quite stable, unhydrolyzed, nonflammable with small excitability to skin and low toxicity. ***This product contains no sodium chloride.***

#### 3. Index:

Purity	pH value	Color
65±1%	6-7	≤50(HAZEN)

#### 4. Main applications

##### 4.1 Flocculant

It's mainly applied to synthesize various kinds of high molecular water treating compounds. Its effects are electric neutralization, adsorption, flocculation, purification

and decoloration, and is also used for sewage treatment. It has evident effects in the fields of decoloration, killing algae and removing organics. High molecular weight Poly-DADMAC homopolymers, or copolymers with acrylamide can be used as filter aid, pigment dispersants for dewatering pigments. It is especially effective with charged particles, to which inorganic flocculants are ineffective. It can also be used for treating pulp waste liquid, clay slurry and refinery wastewaters.

#### 4.2 Paper Making:

DADMAC homopolymers, copolymers and graft copolymers are very effective retention aids as fine cellulose, fillers and pigments. It is also widely used as strengthening agent (dry and wet) for paper; it can shorten dewatering time in making corrugated cardboard. Papers used for electrography should be coated with DADMAC polymers. The polymers provide conductive coatings useful on electrostatic copying.

#### 4.3 Textiles

DADMAC polymers can be used as dye fixing agent for silk, wool and nylon fabric. It gives cloth good stiffness. It can also be used as anti-static agent for textiles. After being treated with DADMAC polymer and then dyed, the fabrics show fresh color and possess color-fastness to washing, abrasion, light and chlorine. Also, it improves the property of ventilation of textiles.

#### 4.4 Cosmetics

The shampoos using Poly-DADMAC as main component have excellent hair conditioning effects and keep the wave setting for a long time without harming the hair. Washed with the shampoo made up of Poly-DADMAC and quaternary ammonium salt and methyl cellulose, the hair becomes soft and manageable. Many hair dyeing recipes are added with Poly-DADMAC or copolymer of DADMAC/AM. Poly-DADMAC is also the main constituent of shaving creams, which helps the spreading and foaming of the creams.

Neutral soaps contain copolymer of DADMAC with AM, which help shaping and forming.

Transparent soaps, added with it, improve swelling and anti-cracking, as well as bacteria-killing ability. The graft copolymers of DADMAC with cellulose can be used as viscosifier for high grade cosmetics.

At present, the research of DADMAC properties and application is vigorous. A large part of it concerns different recipes of

#### 4.5 Food and drugs

Poly-DADMAC is more effective for killing viruses in water and more effective in water treatment as a flocculant than alum and other cationic polymers. Poly-DADMAC can be used for bacteria killing, sterilizing and for subsidence of a swelling in the eye and on the skin. Poly-DADMAC has been approved by the U.S. Food and Drugs Administration as flocculant in manufacturing the papers for use in contact with food and medicines. It is also used as a pigment-dispersant for the paper used for food package. As a flocculant it removes such metal ions such as Fe, Cu and Ca and reduces the content of acids, esters and aldehydes.

The copolymers of DADMAC with acrylic acid can be used as a bactericide for cutting fluids. It is also suitable for inhibiting the growth of weeds and algae. Poly-DADMAC can facilitate penetration of medicine particles into cells. It is a component in a food-preserving composition, which keeps the food in good quality as long as 90 days.

#### 4.6 Applications in minerals and glass

Poly-DADMAC can be used in minerals flotation as poly-electrolytes and coagulants, such as flotation agent in potassium ores, and concentration of gold. It can also be used for uranium extract from sea water.

Applying polyethylene oxide and Poly-DADMAC for treating glass and glass fiber makes into hydrophilic glass ropes or glass powder with good water retention to replace asbestos.

Poly-DADMAC and some of its copolymers can be used as thinner and anti-freezer of coal powders.

In petroleum industry Poly-DADMAC can be made into fluid loss reducer, fracturing fluid and thickening acid. It is the main material for making mud thinner and strong wrapping agent. It is the main component of clay stabilizer which has not only the ability of anti-swelling, but also the ability of inhibiting fines migration. Furthermore, its effect last long. Using the absorption of positive charges and negative charges in sandstone, DADMAC can be used to make water-shutoff agent for sandstone reservoirs and hygroscopic resin water shutoff agent. Poly-DADMAC can also be used for sewage treatment in oilfield and refineries.

#### 4.7 Other applications

A terpolymer of DADMAC and diallylamine can be made into a semi-permeable membrane, the permeability of which can be adjusted through proportionating. This technique is used in many fields of high technology.

DADMAC finds wide applications in clay stabilizing, soil reforming and water conservation in sand soil. It can also increase the adhesion of agro-chemicals to the leaf surface and is widely used for making pesticide.

The foregoing summarizes only some of the applications of chemicals with DADMAC as main component. In recent years various new applications have been developed. Several hundred papers are published each year.

#### 4.8 Synthetic Resin

It can also be used as modifier for synthetic resin, endowed with electrical conductivity and as an antistatic agent.

### 5 Packaging:

Drums, tote bins, tank trucks and rail cars

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