

## Cationic

pH-dependent primary, secondary, or tertiary amines; primary and secondary amines become positively charged at  $\text{pH} < 10$  octenidine dihydrochloride.

Permanently charged quaternary ammonium salts: cetrimonium bromide (CTAB), cetylpyridinium chloride (CPC), benzalkonium chloride (BAC), benzethonium chloride (BZT), dimethyldioctadecylammonium chloride, and dioctadecyldimethylammonium bromide (DODAB).

Cationic surfactants account for only 5-6% of the total surfactant production. They are not generally good detergents nor foaming agents, and they usually cannot be mixed in formulations which contain anionic surfactants, with the exception of non-quaternary nitrogenized compounds. However, cationic surfactants have demonstrated antistatic behaviour and a softening action for fabric and hair rinsing. The positive charge enable them to operate as floatation collectors, hydrophobating agents, corrosion inhibitors as well as solid particle dispersant. Cationic surfactants can be used as emulsifiers in asphaltic emulsions and coatings in general; such as inks, wood pulp dispersions, magnetic slurry etc. Many cationic surfactants are bactericides. They are used to clean and asepsize surgery hardware, to formulate heavy duty disinfectants for domestic and hospital use, and to sterilize food bottle or containers, particularly in the dairy and beverage industries.

They are found as antistatic agents in fabric softeners and hair rinse formulas. They are used in textile manufacturing to delay dye adsorption. In this application they compete with dye and thus slow down their adsorption and help attain uniform coloration. Their action as corrosion inhibitor in acid environment is similar, but in this case they compete with  $\text{H}^+$  ions. Collectors for mineral floatation are often ammonium salts or quats. Asphalts emulsions for roadway pavement and protective coatings and paints are often stabilized by fatty amine salts (at acid pH) or quats (at neutral pH). Benzalkonium and alkyltrimethyl ammonium chloride or bromide are used as antiseptic agents, disinfectants and sterilizing agents. They are also incorporated as additive in nonionic detergents formulation for corrosion inhibition purposes, and (in very small quantity) in anionic powdered formulas to synergize detergency.