



# Polyquaternium-7 is a synthetic polymer

that belongs to the polyquaternium family, which is a group of cationic (positively charged) conditioning agents. It is widely used in personal care products, particularly in hair care and skincare formulations, due to its excellent conditioning, film-forming, and moisturizing properties. The "7" in its name indicates its specific chemical composition among the polyquaternium series.

## Chemical Properties

### 1. **Structure:**

- Polyquaternium-7 is a copolymer composed of acrylamide and dimethyl diallyl ammonium chloride. The polymer chain features repeating units of these two monomers.
- The polymer has quaternary ammonium groups, which are permanently positively charged, giving it strong cationic (positively charged) properties.

### 2. **Solubility:**

- Polyquaternium-7 is highly soluble in water, which makes it easy to incorporate into aqueous-based formulations.
- It forms clear to slightly hazy solutions in water, depending on the concentration and molecular weight of the polymer.

### 3. **Charge Density:**

- The cationic nature of Polyquaternium-7 is due to the quaternary ammonium groups in the dimethyl diallyl ammonium chloride units. This positive charge allows it to strongly interact with the negatively charged surfaces of hair and skin, leading to conditioning and film-forming effects.

### 4. **Viscosity:**

- The viscosity of Polyquaternium-7 solutions can vary depending on the molecular weight of the polymer and the concentration used. Generally, it forms low to moderate viscosity solutions, which are stable across a wide range of pH levels.

- Its viscosity helps in enhancing the texture and spreadability of formulations, making them easier to apply.