Technical Information

AQUEOUS SOLUTION OF PVOH

Generally, PVOH is used by dissolving into water.

1.How to dissolve MOWIOL / KURARAY POVAL (Dissolving procedure)

The solubility of PVOH depends on degree of polymerization and percent hydrolysis. PVOH is charged into cold water and heat it up to get its solution. Direct injection or indirect jacketed heating by steam is the heat source for the dissolution. It is completed if the particle of PVOH disappear in the aqueous solution.

Please note that the dissolving method of completely hydrolyzed grades and partially hydrolyzed grades has a slight difference. Please refer to the following indication.

FULLY HYDROLYZED GRADES

PVOH should must be charged into water within the dissolution vessel at the room temperature, about 15 - 25¡C, with continuous stirring. Since fully hydrolyzed grades of MOWIOL / KURARAY POVAL hardly dissolve at this temperature, no lumps will be formed, and become slurry in cold water. After charging PVOH into the vessel, heating should be started and when the slurry temperature reaches 97 - 98¡C, just before boiling, MOWIOL / KURARAY POVAL is completely dissolved. If the capacity of the agitator is low, continued stirring at this temperature is required until the particles of PVOH disappear.

PARTIALLY HYDROLYZED GRADES

Partially hydrolyzed grades can be easily dissolve in cold water, so it should be cared that large and hard lumps are likely to be formed when charging PVOH into the water. Please refer to the following ' MAJOR NOTICES '.

MAJOR NOTICE

A. The water temperature should be lower than 25¡C, when charging PVOH.

B. The charging speed of PVOH should be as slow as possible.

C. After the charging, the slurry should be continuously stirred for about 10 - 15 minutes without raising the temperature immediately, in order to disperse the particles efficiently.

D. The water temperature should be raised to about 95¡C, to shorten the dissolving time. The lower degree of polymerization is, the lower water temperature is acceptable for making solution.

2. Stability of the viscosity

If the aqueous solution of completely hydrolyzed PVOH is left in low temperature, the higher concentration, and the lower temperature, the more the solution would

be apt to increase its viscosity and form a gel. The lower degree of hydrolysis, the lower concentration, and the higher temperature that the solution stocked, will ease the increasing degree of viscosity.

3. The viscosity of aqueous solution

The viscosity of PVOH aqueous solution differs from grades, the concentration, and the temperature.

4. Surface active properties

PVOH has a surface active and a protective colloid property. Concerning the surface tension of PVOH aqueous solution, the strength of partially hydrolyzed grades, which have more hydrophobic acetic acid groups, is higher than that of fully hydrolyzed grades.

5. Adhesive property

PVOH aqueous solution shows extremely high adhesive property against many materials such as paper, fiber, wood, and other cellulose materials.

6. The compatibility with other water-soluble high polymers

(Comparatively) well compatibility:
CMC (carboxymethyl cellulose), acrylic acid ester, glue, casein, sodium alginate, and so on.

Bad compatibility:
Methylcellulose, hydroxy-ethylcellulose, and so on.

7. Storage

PVOH aqueous solution does not make a chemical change even stored for a long term, however, sometimes it will be putrid, or gather mold or rust, due to the invade of microorganism or mold, water quality, or the material of the storage container. Moreover, the viscosity of solution sometimes rises or it will be gelled as the change on standing. As a countermeasure for these problems, we introduce the following method.

1. For putridity and mold
   Please prevent from the invasion of microorganism or mold, or please add antisepsis or anti-mold agent.

2. For rust
   Please avoid using container, which is susceptible to rust. When using this kind of container, please add anti-rust agent. (100 - 1,000 ppm / PVOH solution)

3. For viscosity increasing
   In case of using PVOH solution, which is apt to increase the viscosity such as high concentration solution of completely hydrolyzed PVA, please consume it as soon as possible or please dilute the solution. It is recommendable to preserve the temperature within the range of 50¡C - 70¡C, in case of storage of high concentration aqueous solution. And the

PVOH solution once gelled can be used as well as before, if the fluidity recovers by heating and churning.

8. Foaming and anti-foaming for the aqueous solution

If foaming occurs during dissolving or using PVOH solution due to the viscosity or churning velocity, please add anti-foaming agent. (500 - 5,000 ppm / PVOH) Further, we are ready to supply Anti-foaming / Defoaming type of "KURARAY POVAL" grades.