

Q&A

21Q3: The number of water utilities which use PAC as coagulant is increasing in the developing countries. But I heard that PAC doesn't work effectively under the bad condition. What kind of condition reduces the effectiveness of PAC in the coagulation process? (Mr. K.A. Japan)

A: Comparing to aluminum sulfate, poly-aluminum chloride (PAC) has advantage in coagulation of raw water with wide range of pH value or with high turbidity and low turbidity. Therefore, PAC can get stable coagulation, even when raw water quality changed. However, in order to get good coagulation result, the appropriate dosing rate and mixing are necessary. Especially rapid mixing just after the dosing is the most important.

Usually the best dosing rate of PAC is decided by Jar test. However, in the real coagulation process, even if PAC of same dosing rate according to Jar test is injected, sometimes it cannot get the same coagulation result as Jar test shows. The biggest cause is insufficient rapid mixing just after the dosing. In the coagulation process, PAC requires more intense rapid mixing than it of aluminum sulfate because of its characteristics.

Jar test is carried out in the small container, therefore the rapid mixing after PAC dosing is done intensely and instantly. However, there are some cases that the rapid mixing takes longer time and is not sufficient because the quantity of processing water is large in the actual PAC dosing process. In order to get same coagulation result as Jar test, the intense rapid mixing same as Jar test is necessary.

Several points dosing or underwater dosing can get good effect of the rapid mixing. When the quantity of process water is small, if one dosing pipe is set appropriately for example just before rapid mixer, even one-point dosing can get intense rapid mixing. When the coagulation effect (settled water turbidity) same as Jar test is provided in the real coagulation process, it can be judged the rapid mixing is appropriate.

As mentioned first, PAC has an advantage which can respond to quality change of raw water. However, usually most raw water can get the sufficient coagulation effect by the appropriate aluminum sulfate dosage. Selection of a coagulant requires the general examination including the comparison by jar test.

(Answerer: Mr. KAGATA Katsutoshi, Kitakyushu City Waterworks Bureau O.B., 2014)