



## 6-6. Disinfection

If the RO system is suspected to be infected by bacteria or mold, e.g. slimy deposit or rotten smell, a disinfection should be performed after the cleaning. The procedure is the same as for cleaning, except the high flow pumping step.

Commonly used disinfectants are formaldehyde, hydrogen peroxide, peracetic acid, and chlorine. Quaternary ammonium disinfectants, iodine, and phenolic compounds should not be used because they cause flux losses.

The effective concentration of formaldehyde is in the range of 0.5 to 3 %. Care should be taken in handling this chemical since it is considered a carcinogen.

A 400 ppm peracetic acid solution (also containing 2,000 ppm of hydrogen peroxide) can be used to disinfect the RO system. The biocidal efficacy of peracetic acid is much higher than hydrogen peroxide. Care must be exercised not to exceed the 0.2% concentration as a sum of both compounds. Only periodic use is recommended since continuous exposure at this concentration may damage the membrane. When the peracetic acid is used, pH adjustment is usually not required.

However, when hydrogen peroxide is employed alone up to 0.2% concentration, pH of the solution is preferably adjusted to be 3. This will ensure optimal biocidal effect and minimum damage to the membrane. If an alkaline cleaning has preceded disinfection, an acid rinsing is recommended for both sides of the membrane. Additionally, hydrogen peroxide can attack the membrane more aggressively at temperature above 25 °C and in the presence of transition metals such as iron and manganese.

CSM membranes can withstand short term exposure to free chlorine (hypochlorite). However, eventual degradation may occur after 200-1000 hours of exposure to one ppm chlorine, depending on feed water characteristics, e.g. pH and the presence of heavy metals. Thus chlorine is not recommended for disinfecting the membrane, but can be used in the pre-treatment prior to the RO elements.

Disinfection using chloramine, chloramine-T, and N-chloroiso-cyanurate is not recommended, since their effectiveness as disinfectants at low concentration (< 3 mg/L) is limited and the compounds can also slowly damage the membranes.