

## ACTIVITY LEVELS OF SELECTED LIQUID GERMICIDES <sup>a</sup>

Procedure/Product	Aqueous Concentration	Activity Level
<b>Sterilization</b>		
✓ Glutaraldehyde	Variable	
✓ Hydrogen Peroxide	6 – 30%	
✓ Formaldehyde	6 – 8% <sup>b</sup>	
✓ Chlorine Dioxide	Variable	
✓ Peracetic acid	Variable	
<b>Disinfection</b>		
✓ Glutaraldehyde	Variable	High to Intermediate
✓ Ortho-Phthalaldehyde	0.5%	High
✓ Hydrogen Peroxide	3 – 6%	High to Intermediate
✓ Formaldehyde	1 – 8%	High to Low
✓ Chlorine Dioxide	Variable	High
✓ Peracetic acid	Variable	High
✓ Chlorine compounds <sup>c</sup>	500-5,000 mg of free/available chlorine per liter	Intermediate
✓ Alcohols (ethyl, isopropyl) <sup>d</sup>	70%	Intermediate
✓ Phenolic compounds	0.5 – 3%	Intermediate to Low
✓ Iodophor compounds <sup>e</sup>	30 – 50 mg of free iodine per liter; up to 10,000 mg of available iodine per liter	Intermediate to Low
✓ Quaternary ammonium compounds	0.1 – 0.2%	Low

<sup>a</sup> This list of chemical germicides centers on generic formulations. A large number of commercial products based on these generic components can be considered for use. Users should ensure that commercial formulations are registered with EPA or by the FDA.

<sup>b</sup> Because of the ongoing controversy of the role of formaldehyde as a potential occupational carcinogen, the use of formaldehyde is limited to certain specific circumstances under carefully controlled conditions, e.g., for the disinfection of certain hemodialysis equipment. There are no FDA-cleared liquid chemical sterilants/disinfectants that contain formaldehyde.

<sup>c</sup> Generic disinfectants containing chlorine are available in liquid or solid form, e.g., sodium or calcium hypochlorite. Although the indicated concentrations are rapid acting and broad spectrum (tuberculocidal, bactericidal, fungicidal, and virucidal), no proprietary hypochlorite formulations are formally registered with the EPA or cleared by the FDA. Common household bleach is an excellent and inexpensive source of sodium hypochlorite. Concentrations between 500 and 1,000 mg of chlorine per liter are appropriate for the vast majority of uses requiring an intermediate level of germicidal activity; higher concentrations are extremely corrosive as well as irritating to personnel, and their use should be limited to situations where there is an excessive amount of organic material or unusually high concentrations of microorganisms (e.g., spills of cultured material in the laboratory).

- <sup>d</sup> The effectiveness of alcohols as intermediate-level germicides is limited, since they evaporate rapidly, resulting in very short contact times, and also lack the ability to penetrate residual organic material. They are rapidly tuberculocidal, bactericidal, and fungicidal, but may vary in spectrum of virucidal activity. Items to be disinfected with alcohols should be carefully pre-cleaned and then totally submerged for an appropriate exposure time (e.g., 10 minutes).
- <sup>e</sup> Only those iodophors registered with the EPA as hard-surface disinfectants should be used, and the instructions of the manufacturer regarding proper dilution and product stability should be closely followed. Antiseptic iodophors are not suitable for disinfecting medical instruments or devices or environmental surfaces.

Adapted from "Biological Safety Principles and Practices", 4<sup>th</sup> Edition, Fleming, D.O., and Hunt, D.L., ASM Press, 2006