Sterilization and Decontamination

Techniques commonly used for the sterilization, disinfection[1], and radioactive decontamination of laboratory products are outlined below. Thermo Fisher Scientific makes no claims as to the effectiveness of these methods in achieving sterilization or disinfection of specific organisms. Refer to the Laboratory Biosafety Manual[2] for recommendations on method applications. Thermo Fisher Scientific makes no claims as to the effectiveness of the radioactive decontamination reagents.
The Sterilization and Decontamination Compatibility Chart is intended to assist in the selection of the best sterilization/disinfection/decontamination procedure for Thermo Scientific rotors, tubes, bottles, and adapters.
CONSULT THE STERILIZATION AND DECONTAMINATION COMPATIBILITY CHART PRIOR TO USING ANY OF THE FOLLOWING TECHNIQUES.

STERILIZATION TECHNIQUES

Autoclave: A hot steam sterilization technique (generally 121°, 15 psi, 15 minutes) commonly used to destroy microorganisms. (SEPARATE INDIVIDUAL PIECES BEFORE AUTOCLAVING.)
Ethylene Oxide Gas [3]: A gas sterilization technique compatible with most metals and all Thermo Scientific rotors, tubes, bottles, and adapters. Ethylene oxide is highly diffusive and permeates areas not reached by liquids or steam.
Formaldehyde Gas [2,3]: A gas sterilization technique compatible with most metals and all Thermo Scientific rotors, tubes, bottles, and adapters. Sterilization occurs after an 8-hour exposure to 0.3 g/ft3 at temperatures greater than 21°C and a relative humidity greater than 70%.
Glutaraldehyde Solutions [4]: These activated liquid sterilization solutions are compatible with almost all material that can be submerged. Sterilization is achieved after 10 hours of immersion. (These solutions are available commercially as Glutarex®, Cidex®, and Sonacide®[5].)
Ultraviolet (UV) Radiation [6]: A UV lightwave sterilization technique compatible with most metals and some plastics. Both radiation intensity and exposure time must be controlled to ensure sterilization.

Biological Disinfection

Alcohol[2]: Alcohols (70% ethanol or 70% isopropanol) are effective for inactivating vegetative bacteria, lipid viruses, and some nonlipid viruses. The minimum contact time is 10 minutes.
Hypochlorite [2]: Sodium hypochlorite (a 1:8 dilution of household liquid chlorine bleach) inactivates vegetative bacteria, lipid and nonlipid viruses, and bacterial spores. The minimum contact time is 10 minutes. This reagent is a strong oxidizing agent and corrosive to metals.
Formaldehyde Solutions[2]: Formaldehyde gas in water is generally marketed in concentrations of approximately 37% and is referred to as Formalin. This solution is a broad spectrum disinfectant and inactivates the same types of organisms as chlorine. The minimum contact time is 10 minutes. Formaldehyde is a toxic chemical with a strong, pungent odor.
Glutaraldehyde Solutions [2,4]: These activated liquid sterilization solutions are compatible with almost all materials that can be submerged. These solutions (available commercially as Glutarex®, Cidex®, and Sonacide®[5]) are broad spectrum disinfectants similar to chlorine and formaldehyde. The minimum contact time is 10 minutes.
Phenolic Compounds [2]: Phenolic compounds (such as the orthopenyl phenolics in commercial disinfectants such as Lysol®[7]) are effective against vegetative bacteria, lipid viruses, and some nonlipid viruses. The minimum contact time is 10 minutes.

Radioactive Decontamination

Surface Washes: These liquid and foam solutions (available commercially as Radiacwash®[8] and Count- Off™[9]) solubilize and remove radioactive contamination. For rotors, equal parts solution of distilled water, 70% ethanol, and 10% SDS can be used, followed by ethanol and then distilled water rinses.

1 Sterilization is defined as a process that unconditionally kills all microbes without exception. Disinfection is a process that kills all microbes except bacterial spores.
2 Laboratory Biosafety Manual, World Health Organization, 1983, pp 61-66.
3 Phillips, G. B. and Miller, W. S., Industrial Sterilization, Duke University Press, NC (1972).
4 Glutarex® Disinfecting and Sterilizing Solution, Product Profile from 3M.
5 Glutarex® is a registered trademark of the 3M Company. Cidex® is a registered trademark of Surgicose, Inc. Sonacide® is a registered trademark of Wave Energy Systems, Inc.
6 Lab Safety at the Center for Disease Control, U.S. Department of Health, Education and Welfare, HEW Publication No. CDC 77-8118 (1977).
7 Lysol® is a registered trademark of Lehn & Fink Products, Division of Sterling Drug, Inc.
8 Radiacwash® is a registered trademark of Atomic Products Corporation.
9 Count-Off™ is a trademark of NEN Research Products.

Sterilization and Decontamination Compatibility

Method	POLYETHIMIDE	ALUMINUM	ANODIC COATING for ALUMINUM	BUNA N	CELLULOSE ACETATE BUTYRATE	DELRIN®	GLASS	NEOPRENE	NORYL®	NYLON	PET*, POLYCLEAR™	POLYALLOMER	POLYCARBONATE*	POLYETHYLENE	POLYPROPYLENE	POLYSULFONE	POLYVINYL CHLORIDE	RULON A®, TEFLON®	SILICONE RUBBER	STAINLESS STEEL	TITANIUM	TYGON®	VITON
Sterilization																							
Autoclave (121°C)	S[3]	M[1]	–	M	U	M	S	U	M	U	U	S[2]	M	M	S	S	M	S	S	S	S	M	S
UV Irradiation	M	S	–	–	S	S	S	–	S	M	U	U	U	U	U	S	S	S	S	S	S	S	–
Ethylene Oxide	–	S	S	U	–	S	S	S	–	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Formaldehyde (gas)	–	S	S	S	–	S	S	S	S	S	M	S	S	S	S	S	S	S	S	S	S	S	S
Glutaraldehyde (2%)	S[3]	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Biological Disinfection																							
Ethyl or Isopropyl																							
Alcohol (70%)	S[3]	S	S	S	M	M	S	S	S	S	M	S	M	S	S	M	M	S	S	M	S	M	M
Hypochlorite (5%)																							
[chlorine bleach]	S[3]	U	U	M	S	U	S	M	S	S	S	S	S	S	S	S	M	S	M	M	M	M	S
Glutaraldehyde (2%)	S[3]	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Phenolic Derivatives	–	U	–	U	–	U	S	U	S	U	–	M	U	S	M	U	U	S	U	U	U	U	S
Formaldehyde (40%)	–	M	M	M	S	S	S	S	S	S	M	S	S	S	S	M	M	S	S	S	S	M	S
Radioactive Decontamination																							
Radiacwash®	M	–	–	S	S	S	S	S	S	S	–	S	S	S	S	S	S	S	–	–	–	S	S
Count-Off™	S[3]	U	U	S	S	S	S	S	S	S	–	S	S	S	S	S	S	S	–	S	S	S	S
Water/Ethanol/SDS	M	S	S	S	U	M	S	S	S	S	M	S	M	S	S	M	S	S	S	S	S	M	M

[1] Aluminum alloy used in the following rotors is autoclavable: A/S-400, LA/S-400, and all SUPRASPEED and SUPERSPEED rotors except S-20/36, S-20/20, S-20/17, SH-MT, SH-80, HB-6, HB-4, HS-4, SV-288, and SV-80.
[2] Autoclave in tube rack; allow to cool before removing.
[3] Refer to Rotor Manual for restrictions.
* Polyethyleneterephthalate

Key:
S = Satisfactory
M = Moderate attack, may be satisfactory; suggest testing.
U = Unsatisfactory, not recommended.
- = Performance unknown; suggest testing.

Radiacwash® is a product of Atomic Products Corporation, Center Moriches, NY; Sorvall® makes no claims as to the effectiveness of Radiacwash.
Count-Off™ is a product of NEN Research Products, Boston, MA.
Polyclear™ is a trademark of Seton Scientific.
All trademarks are the property of their respective owners.
NOTE: SEPARATE CAPS AND/OR SEALING ASSEMBLIES FROM OAK RIDGE BOTTLES BEFORE AUTOCLAVING.