

STERILIZATION AND DISINFECTION

A Reference for Ophthalmic Practice in Developing Countries

Method	Achieves	Timing	Destroys	Advantages	Limitations	Power Source	Suitable for	Minimum temperature
General autoclave	Sterilization	Approximately 45 minutes Follow manufacturer's instructions	Bacteria Spores Viruses Fungi	Low running cost Minimal maintenance Suitable for busy unit Drying cycle	Difficult to obtain spare parts in developing countries	Electric (single or 3 phase) Kerosene / Paraffin	All metal instruments Drapes Gowns Dressings Toughened plastic Glass	121°C
Bench top autoclave	Sterilization	20 minute cycle	Bacteria Spores Viruses Fungi	Quick and efficient Small, bench-top size Suitable for busy unit	High running cost Difficult to obtain spare parts in developing countries No drying cycle Sensitive to voltage fluctuations	Electric (single phase)	All metal instruments Toughened plastic Glass	134°C
Portable autoclave, Domestic pressure cooker	Sterilization	Minimum of 15 minutes Follow manufacturer's instructions	Bacteria Spores Viruses Fungi	Low running cost Quick and efficient Suitable for mobile units Spare parts usually readily available Minimal maintenance	Drying cycle unreliable Sensitive to voltage fluctuations Relatively small Various manufacturers whose instructions must be followed	Electric (single phase) Gas Kerosene / Paraffin Charcoal Wood	All metal instruments Drapes Gowns Dressings Toughened plastic Glass	121°C
Hot air oven	Sterilization	2 hour cycle	Bacteria Spores Viruses Fungi	Minimal maintenance Drying cycle	Expensive Slow Instruments get extremely hot and cannot be used immediately Must not be used in a confined space	Electric (single phase)	All metal instruments Toughened plastic Glass	180°C
Ethylene oxide C₂H₄O	Sterilization	Follow manufacturer's instructions	Bacteria Spores Viruses Fungi	Bulk quantities Suitable for delicate items and items which must be kept dry	Very expensive Dangerous, explosive Carcinogenic Only suitable for large tertiary centres with appropriate facilities	Electric with C ₂ H ₄ O gas cartridges	Plastic eye shields Ophthalmic instruments and probes Delicate tubing	Varies with type of equipment used
Formalin	Sterilization	12 hours	Bacteria Spores Viruses Fungi	Low running costs Suitable for delicate items that are susceptible to rust Cabinet can hold a large quantity of instruments Usually readily available	Airtight containers required Irritant to skin, to eyes and if inhaled Gloves and eye protection advisable Items must be rinsed in sterile water before use Slow	Electricity for heat source if a large cabinet is used (eg: an adapted refrigerator not used for cooling)	All metal instruments Toughened plastic Glass Delicate tubing	Room temperature 20°C Well ventilated
Ionising irradiation	Sterilization	Follow manufacturer's instructions	Bacteria Spores Viruses Fungi	Bulk quantities Suitable for delicate items and items which must be kept dry	Usually only available commercially and used by large manufacturing companies	Gamma rays	Needles Syringes Sutures Toughened plastic	

Boiling	High level disinfection	Minimum of 10 minutes	Bacteria Viruses Fungi	Low running cost Quick and efficient Easy to teach Suitable for all situations Minimal maintenance Readily available	Does not kill spores Blunts scissors and knives Causes rusting of instruments	Electric (single phase) Gas Kerosene / Paraffin Charcoal Wood	Heavy metal instruments Plastic Glass Needles Sutures	100°C
Method	Achieves	Timing	Destroys	Advantages	Limitations	Suitable for		
Glutaraldehyde 2%	Sterilization Disinfection	Sterilization in 10 hours Disinfection in 10 minutes Follow manufacturer's instructions	Bacteria Spores Viruses Fungi		(<i>Withdrawn from sale May 2002</i>) Irritant to skin, eyes and if inhaled Gloves and eye protection advisable May leave greasy residue Items must be rinsed and lumens irrigated thoroughly before use	All metal instruments Airways, endotracheal tubes and face masks Plastic Glass		
Perasafe recommended alternative to Glutaraldehyde	Sterilization	10 minutes	Bacteria Spores Viruses Fungi	Non-corrosive No toxic vapour No requirement for ventilation, air extraction or protective clothing Environmentally safer	Not yet fully available in all developing countries Equipment must be well rinsed and flushed through with sterile water Not suitable for indirect ophthalmology lenses or applanation prisms	All metal instruments including heat sensitive endoscopes, airways, endotracheal tubes and anaesthetic face masks A more dilute version can be used as a disinfectant cleaning solution and for soaking contaminated linen Follow manufacturer's instructions		
Isopropyl alcohol 70% (Methylated spirit)	Disinfection	10 minutes The quantity used for soaking must be changed daily	Bacteria Spores Viruses (but not entero or adeno viruses)	Low cost Readily available Good for use on indirect ophthalmoscope lenses	Highly flammable Corrosive (do not leave metal instruments soaking longer than 10 minutes) Tonometry items must be rinsed and wiped before use Evaporates Does not kill entero or adeno viruses	All metal instruments Mechanism of Schiötz tonometer and applanation prism tip Indirect ophthalmology lenses		
Sodium hypochlorite	Disinfection	10 minutes The quantity used for soaking must be changed daily	Bacteria Spores Viruses	Becoming more readily available Reasonable cost	Highly volatile and corrosive (do not use metal container to soak items) Bleach	Indirect ophthalmology lenses Applanation prisms; only the tip of applanation prism should sit in solution, and must be rinsed and wiped dry before use on the eye		
Chlorhexidine	Disinfection	10 minutes The quantity used for soaking must be changed daily	Bacteria Spores Fungi	Low cost Readily available	Evaporates Does not kill viruses Blunts scissors and knives	Metal instruments Plastic Rubber Mechanism of Schiötz tonometer and applanation prism tip		
Povidone iodine	Disinfection	10 minutes The quantity used for soaking must be changed daily	Bacteria Spores Viruses (but not entero or adeno viruses) Fungi	Low cost Readily available Versatile	Stains fabrics and surfaces Discolours instruments Solution is dark, difficult to see items in soak Irritant to skin Does not kill entero or adeno viruses	All metal instruments Sutures Blades		

