PURPOSE AND SCOPE

To ensure that the sterilising equipment is suitable for the requirements of the dental practice.

BACKGROUND

Steam is the most widely used agent for sterilisation for surgical and dental instruments. In steam sterilisation the combination of heat and moisture, maintained at a pre-set temperature/pressure/time relationship coagulates cell protein effectively killing micro-organisms.

Heat bead devices, microwave ovens, pressure cookers, incubators, ultraviolet cabinets, boiling water unit, ultrasonic cleaners and similar devices will not sterilise items and must not be used as sterilisers.

1. Principles of steam sterilisation

Bench top steam sterilisers must be approved and operated according to AS/NZS 4187 and/or AS/NZS 4815.

The steriliser and associated equipment selected must be suitable for the type of items requiring reprocessing by the facility.

The items to be sterilised should be compatible with the process.

The items to be sterilised must be thoroughly cleaned prior to sterilisation.

The steam quality must be suitable for the effective running of the steriliser. (See AS 1410)
- Steam should have a dry fraction of 97% and above.
- Wet steam is not suitable for sterilisation.
- Steam should not be superheated beyond 2°C of the saturated steam temperature.

The manufacturers written instructions for operating the steriliser should be followed at all times.

An operator's manual must be on-site at all times.

The choice of steriliser and selected cycles must be appropriate for particular items or types of loads, therefore the suitability of a selected sterilisation process for particular types of items or loads must be verified by validation.

For moist heat sterilisation using steam as a sterilant, all surfaces to be sterilised must be subjected to saturated steam at a pre-determined temperature for a pre-determined period of time. The international temperature/ pressure/ time relationship for steam under pressure for sterilisation must be met. The cycle time and temperature must reflect the type of load and packaging material being used. Refer to Table 1 below.

Table 1 International temperature pressure-time relationship for steam under pressure sterilisation.

Temperature °C	Pressure kPa	Presssure mb	Pressure psi	Holding time Minutes
121	103	1030	15	15
126	138	1380	20	10
132	186	1860	27	4
134	203	2030	30	3

2. Types of steam sterilisers

2.1 Downward displacement- jacketed steam steriliser

This type of steriliser can sterilise and dry wrapped items. Steam is used in the chamber and the jacket space. The steam in the chamber is used during the sterilising cycle the steam in the jacket space to prevent condensate forming inside the jacket and saturating the load, the steam in the jacket also assists in the drying phase.

Due to the difficulty of air removal and steam penetration the ability to achieve sterilisation of cannulated instruments need to be validated.

2.2 Flash steriliser/ downward displacement steriliser

The use of flash sterilising shall be restricted to situations where a single instrument has been dropped. This type of steriliser can only be used for unwrapped non porous items.

2.3 Portable small steam (benchtop) sterilisers

These sterilisers are appropriate for use in health care facilities where small quantities of small articles. These types of sterilisers may be capable of generating their own steam or may be attached to external steam generators. The differences between the types of portable steam sterilisers are related to the removal of air from the sterilising chamber prior to the commencement of the sterilising stage. AS 2182 specifies the manufacturing requirements for this type of steriliser.

The method of air removal by small steam sterilisers impact on the types of items that can be effectively sterilised. Process validation must be undertaken for existing portable sterilisers to ensure the air removal system is capable of removing air from the cycle from the types of items being processed.

2.4 Pre-vacuum sterilisers

The pre-vacuum steriliser differ from the downward displacement types in that air is eliminated from the chamber and the load by mechanical means. They provide a more effective method of air removal therefore hastening steam penetration and increasing the efficiency of the drying cycle.

The types of sterilisation cycles delivered by steam sterilisers can be categorised according to Table 2.

Table 2 Types of sterilisation cycles and their intended use

Type	Description of intended use
N	The sterilisation of unwrapped, solid items.
B	The sterilisation of all wrapped (single or double) or unwrapped items, including porous and cannulated items that do not exceed the specifications of Hollow load Type A (* for hollow objects where the ratio of the length of the hollow portion to its diameter is more than 1.5. In these cycles there is a greater challenge for air removal).
S	The sterilisation of items as specified by the manufacturer. The available cycles(s) need to be capable of sterilising unwrapped solid items and at least one other of the following load types: (a) Porous items. (b) Small porous items. (c) Hollow load Type A. (d) Hollow load Type B. (e) Single layer wrapped items. (f) Double wrapped items.

2.5 Dry heat sterilisers

Dry heat sterilisation is not recommended for routine sterilising of dental instrument and equipment.

2.6 Hydrogen peroxide gas plasma

Chemiclaves (e.g. Hydrogen peroxide gas plasma) is not recommended for routine sterilising of dental instrument and equipment.

REFERENCES

Standards Australia AS/NZS 4187 2014

Standards Australia (2006) AS/NZS 4815 Office-based health care facilities-Reprocessing of reusable medical, surgical instruments and equipment, and maintenance of the associated environment, Standards Australia, Sydney.

Australian Dental Association (2015), Guidelines for Infection Control Third Edition, Australia, NSW.