



REPROCESSING OF DENTAL HAND INSTRUMENTS AND ACCESSORIES

1.0 Fundamental points

All instruments are to be cleaned and sterilized prior to each use. In addition, cleaning and sterilization is also required for the first use of non-sterile instruments after removal from the protective packaging. Effective cleaning and is an indispensable requirement for proper instrument sterilization. The user is responsible for the sterility of the instruments. Therefore, please ensure that only validated procedures are used for cleaning and sterilization. The sterilization equipment must also be maintained and checked regularly, as well as the validated parameters applied to each cleaning and sterilization cycle. Consider 4.0 Special Procedures section for processing exceptions of specific instruments. Additionally, consider the legal provisions valid for your country as well as to the hygienic instructions of the doctor's practice or hospital.

2.0 Instrument Reprocessing Steps

2.1 Cleaning

2.1.1 Basics

If possible, an automatic procedure in a dental instrument washer or ultrasonic bath should be used for cleaning of the instruments. A manual procedure, such as hand scrubbing, should only be used if an automatic procedure is not available, if debris is remaining after automated cleaning or if such a method is not compatible with specific materials; in this case, the significantly lower efficiency of a manual procedure must be considered.

The pre-treatment step is to be performed in both cases.

All assembled instruments must be disassembled before reprocessing (for further details, please see 4.0 Special Procedures section).

Protection of Staff Members:

All used and contaminated Instruments must be handled with protective utility gloves. Contaminated Instruments must be cleaned as early as possible in the reprocessing process, in order to maximize safety for staff members when handling contaminated instruments.

2.1.2 Pre-treatment

Before processing the instruments single or in a tray or cassette system, remove coarse impurities on the instruments immediately after application (within a maximum of two hours). Instruments with impurities have to be pre-treated within two hours from the application.

Use an enzymatic cleaner, like Pascal International's Citrizyme. When using an enzymatic cleaner like Citrizyme, pre-soak for 10 minutes at 95-140°F (35-60°C). For other cleaning agents and disinfectants, the instructions of the manufacturer must be observed.

For manual removal of coarse impurities use only a soft brush or a long handled soft brush, but in no case metal brushes or steel wool.

2.1.3 Automatic Cleaning in an automated washer disinfecter

Consider the following items, when using an automated washer disinfecter:

- fundamentally approved efficiency of the washer disinfecter

- fundamental suitability of the program for instruments as well as sufficient rinsing steps in the program
- post rinse only with low contaminated and deionized water (max. 10 germs/ml, max. 0.25 endotoxin units/ml) for example purified water
- only use filtered air for drying
- regular maintenance and inspection/calibration of the washer disinfector.

For the selection of detergents to be used with the automated washer disinfector, consider the following items:

- fundamental suitability for cleaning of instruments
- additional application
- if instruments are not compatible with the automated washer please follow the recommended instructions for the manual cleaning
- compatibility of the detergents with the instruments (see 3.7 Material resistance section and 4.0 Special Procedures section).
- Consider the instructions of the detergent manufacturers regarding concentration and soaking time.

Procedure:

1. Completely disassemble instruments if applicable.
2. Place the disassembled instruments in a cassette or any other tray system suitable for the instrument and place it in the automated washer disinfector (no contact between the instruments). If applicable: Connect the instruments by use of a suitable rinsing adapter to the rinsing port of the automated washer disinfector.
3. Start the program.
4. Remove the instruments from the automated washer disinfector after end of the program.
5. Inspect and package the instruments immediately after removal (see sections 3.2 Inspection, 3.3 Maintenance, and 3.4 Packaging). If necessary allow post drying step in a clean place.

2.1.4 Manual and Ultrasonic Cleaning

2.1.4.1 General information

Consider the following items during selection of the cleaning detergents:

- fundamental suitability for the cleaning of dental instruments
- compatibility of the detergents used with the instruments (see 3.7 Material Resistance section and 4.0 Special Procedures section)
- powder based cleaners have to be dissolved completely in water before immersing the instruments into the solution
- observe the instructions of the manufacturer with respect to the concentration of the cleaning solution, the time of exposure and the temperature.

Consider the instructions of the detergent manufacturers regarding concentration and soaking time. Please use only freshly prepared solutions as well as only low contaminated and deionized water (max. 10 germs/ml) as well as low endotoxin contaminated water (max. 0.25 endotoxin units/ml), i.e. purified water, and filtered air for drying, respectively.

2.1.4.2 Manual Cleaning

1. Completely disassemble the instruments, if applicable.
2. Soak the disassembled instruments for the recommended soaking time in the cleaning solution and make sure that the instruments are sufficiently immersed.
3. Remove the instruments from the cleaning solution and post rinse them extensively with low contaminated and deionized water (i.e. purified water).
4. Inspect the instruments for proper cleaning.
5. Thoroughly dry prior to packaging for sterilization.

2.1.4.3 Ultrasonic Cleaning

1. Completely disassemble the instruments if applicable. Soak the disassembled instruments for the recommended soaking time in the cleaning solution, and make sure that the instruments are sufficiently immersed. Use the processing time recommended by the manufacturer of the detergent. Note: There should not be any contact between the instruments.
2. Use an enzymatic ultrasonic cleaner, like Pascal Internationals Citrizyme. Ultrasonic cleaning time is a minimum of 10 minutes. Citrizyme is not compatible with aluminum instruments.
3. If you are using a cassette system, the ultrasonic cleaning time has to be at least 16 minutes, unless a longer exposure time is required by the manufacturer of the detergent. Do not overload the Ultrasonic Cleaning unit. Use "Sweep modus" if available. Remove the instruments from the cleaning solution and post rinse them intensively with low contaminated and deionized water (i.e. purified water) for best results.
4. Inspect the instruments for a good cleaning result. Thoroughly dry prior to packaging for sterilization.

2.2 Inspection

Inspect all instruments after the cleaning and rinsing step for corrosion, damaged surfaces, and impurities. Do not further use damaged instruments. If instruments are still visibly soiled, clean again.

2.3 Maintenance

Light corrosion on the surface can be removed with a light penetrating. If the corrosion cannot be completely eliminated, the instruments should be removed from use. Otherwise such corrosion could damage other instruments. After treating an instrument with penetrating oil, the instrument must be cleaned and sterilized once more. Hinged instruments have to be lubricated with a lubricant suitable for steam sterilization.

2.4 Packaging

We recommend the use of a cassette system, sterilization wrap, or suitable sterilization containers, if the following requirements are fulfilled:

- FDA approved
- suitable for steam sterilization (temperature resistance up to at least 141 °C (286 °F), sufficient steam permeability)
- sufficient protection of the instruments and the sterilization packaging against mechanical damage
- regular maintenance according to the manufacturer's instructions (Sterilization Containers: limitations also see 4.0 Special Procedures section)
- make sure the devices are completely dry before packaging.

2.5 Sterilization

Please use only the recommended sterilization procedures listed below. Other sterilization procedures are the responsibility of the user. Pascal International recommends a minimum 30-minute dry time; however, defer to the manufacturer's instructions for the equipment used.

2.5.1 Steam sterilization

- fractionated vacuum or gravity procedure
- sufficient product drying must be ensured after sterilization and before handling, see table below for recommendations.
- steam sterilizer according to or AAMI/ANSI ST55 and AAMI/ANSI ST8
- validated according to or ANSI/AAMI ST 79 (valid IQ/OQ (commissioning) and product specific performance qualification (PQ))

Minimum cycle times for gravity-displacement steam sterilization cycles (Class N)

Item	Exposure time at 250°F (121°C)	Drying times
Wrapped instruments	30 minutes	Minimum 30 minutes

- NOTE: This table represents the variation in sterilizer manufacturer's recommendations for exposure at different temperatures. For a specific sterilizer, consult only that manufacturer's recommendations.

Minimum cycle times for dynamic-air-removal steam sterilization cycles (Class B)

Item	Exposure time at 270°F (132°C)	Drying times
Wrapped instruments	4 minutes*	Minimum 30 minutes

- NOTE: This table represents the variation in sterilizer manufacturer's recommendations for exposure at different temperatures. For a specific sterilizer, consult only that manufacturer's recommendations.

*The autoclave sterilization cycle recommended in this document is consistent with U.S. standards and other sterilization cycles, typically used by Class B autoclaves, including "prion" mode (134°C at 18 minutes). May also be used without damaging the instrument.

2.5.2 Inspection and Maintenance Recommendations for Steam Sterilizers:

- The manufacturer's instructions with respect to routine inspection and the regular maintenance of the Sterilizer must be observed.
- The sterilizer must be cleaned on a regular basis.
- Only low contaminated and deionized water (i.e. purified water) should be used.
- The sterilized items have to be completely dried after sterilization and before handling. Sterilizers with an automatic drying program are recommended.

2.5.3 Restrictions:

- The flash sterilization procedure must not be used.
- Do not use radiation sterilization, formaldehyde sterilization, ethylene oxide sterilization, or plasma sterilization.
- The application of dry heat sterilization is the responsibility of the user.

2.6 Storage

Please store the instruments after sterilization in a dry and dust-free place in the clean section of the instrument processing area. Sterilization can only be maintained, if the instruments remain packaged or wrapped - impermeable to micro-organisms – following validated standards. The status of the sterilization has to be clearly indicated on the wrapped packages or the containers. For safety reasons, keep sterile and non-sterile instruments strictly apart.

2.7 Material resistance

Detergents or disinfectants containing the following substances must not be used:

- strong alkalines (> pH 9)
- strong acids (< pH 4)
- phenols or iodophors
- interhalogenic agents/halogenic hydrocarbons/iodophors
- strong oxidizing agents/peroxides
- organic solvents.

Do not clean any instruments, sterilization trays or sterilization containers using metal brushes or steel wool.

Do not expose any instruments to temperatures higher than 141 °C (286 °F). Exposure to higher temperatures is the responsibility of the user.

Water quality may influence the result of the cleaning of the instruments. Corrosion could be caused by high contents of chloride or other minerals in the tap water. If problems with stains and corrosion occur and other reasons can be excluded, it might be necessary to test the tap water quality in the area. With the use of completely deionized or distilled water most water quality problems can be avoided beforehand.

2.8 Reusability

The instruments can be reused, unless indicated otherwise indicated. The life time of instruments depends on the frequency of use, the care of the user and proper reprocessing methods. The user is responsible for inspecting instruments prior to each use, and for the use of damaged and dirty instruments (no liability in case of disregard). Re-sharpen instruments if necessary. Completely remove any residues from the sharpening process, such as metal residue or sharpening oil. In case sharpening is done, remember to repeat the cleaning and sterilization process.