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Standard Guide for Care and Handling of Stainless Steel Surgical Instruments¹

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1. Scope

1.1 This guide is intended to provide a better understanding of the care of stainless steel surgical instruments intended for reuse. This guide is not intended for use with electrical, pneumatic, or other powered surgical instruments.

1.2 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- F899 Specification for Wrought Stainless Steels for Surgical Instruments
- F921 Terminology Relating to Hemostatic Forceps
- F1026 Specification for General Workmanship and Performance Measurements of Hemostatic Forceps
- F1078 Terminology for Surgical Scissors—Inserted and Non-Inserted Blades
- F1079 Specification for Inserted and Noninserted Surgical Scissors
- F1089 Test Method for Corrosion of Surgical Instruments
- F1325 Specification for Stainless Steel Suture Needle Holders—General Workmanship Requirements and Corresponding Test Methods

3. General

3.1 *Stainless Steel Types*—The stainless steels most used are martensitic and austenitic types such as those in Specification F899. Martensitic stainless steel contains iron, chromium, and sufficient carbon so that when it is hardened by heat treatment, a substantial martensitic structure is the result. Austenitic

stainless steel has better corrosion resistance and contains iron, chromium, and nickel. It has a substantial austenitic structure and a lower carbon content. Although it cannot be hardened by heat treatment, it can be work-hardened.

3.2 *Passivation*—Stainless steel can spot, stain, and corrode. This is minimized by passivation which is a process used to create a protective chromium oxide surface layer while removing surface carbon and iron. This is accomplished in the atmosphere slowly or through immersion in oxidizing solution or through an electro-polish process. Through repeated processing, the passivation layer will thicken until a good protective film is formed.

3.2.1 Never expose instruments to strong acids such as hydrochloric, aqua regia, dilute sulphuric, carbonic, and tartaric.

3.2.2 Avoid contact with salt solutions such as aluminum chloride, mercury salts, and stannous chloride. Also avoid contact with potassium thiocyanate and potassium permanganate and limit contact with iodine solutions to periods of less than 1 h.

3.2.3 Chloride-bearing solutions such as blood and saline can cause localized corrosion. Avoid prolonged exposure to or rinsing in saline solutions or corrosion and pitting will occur. Use demineralized or distilled water instead. Place instruments into water, an enzymatic solution, or a disinfectant bath immediately after use so the blood or other material will not dry on them prior to transport to the designated cleaning/reprocessing area.

4. General Care of Instruments

4.1 *General*—Use instruments only for their intended purpose, such as cutting, holding, clamping, retracting, and so forth. Avoid undue stress or strain when handling and cleaning. Standard terminology relating to hemostatic forceps and surgical scissors are found in Terminology F921 and Terminology F1078.

4.1.1 *Hemostatic Forceps*—These forceps are designed to clamp blood vessels. They should not be used to clamp towels, suction tubing, or as needle holders or pliers. Misuse generally results in misalignment and even cracked box locks.

4.1.2 *Needle Holders*—Although designed to withstand some force, they are not to be used as pliers, jaw misalignments being the result. Select a needle holder matching the size needle being used.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

4.1.3 *Scissors*—Do not use scissors for the wrong job, otherwise, the tips will become misaligned and the blades will dull or chip. Delicate scissors should be particularly guarded against misuses. Use tissue scissors for tissue dissections only, not for cutting suture material or wires.

4.1.4 *Microsurgical Instruments*—Microsurgical instruments are most susceptible to damage through misuse or rough handling. Consequently, extra care must be taken to avoid compromising their exacting performance. To minimize damage, the following should be done:

4.1.4.1 Inspect the instrument when purchased and after each use and cleaning, preferably under magnification.

4.1.4.2 Only use for its intended purpose.

4.1.4.3 After each use, remove blood and debris from instrument. A non-fibrous sponge may be used to eliminate snagging and breakage. (**Warning**—When handling sharp instruments, use extreme caution to avoid injury. Consult with an infection control practitioner to develop and verify safety procedures appropriate for all levels of direct instrument contact.)

4.1.4.4 Clean and thoroughly dry before packaging or storing. Avoid using a washer decontaminator or an ultrasonic cleaner (see [Appendix X2](#)).

4.1.4.5 Avoid metal-to-metal contact by using special racks designed to separate and protect.

4.1.4.6 Do routine preventive maintenance such as sharpening and realigning. Sterilization by dry heat or chemical vapor should be considered for these instruments.

4.1.5 *Instrument Kits*—Select an instrument tray which suits the size of the kit. Placing a large instrument kit in a small instrument tray may lead to broken instruments, bent tips, or dull scissors. Put heavier instruments such as retractors on the bottom and lightweight instruments on the top. Ring-handled instruments should be kept open with a wire holder or pin. Curved clamps should all point in the same direction to protect the tips. Scissors should be kept separate. Cupped instruments should be placed so that water does not collect in them during sterilization. Separate instruments of dissimilar metals by separate processing; otherwise galvanic corrosion or electrolytic deposition may result.

4.1.6 *Other Sharp Instruments*—Rongeurs, bone-cutting forceps, drill bits, reamers, and so forth should be used to cut bone, not wire or pins. Sometimes it is necessary to use rongeurs or osteotomes to chip bone away from bone plates and screws, which may nick or dull the blades. An alternate approach is to keep an older set of rongeurs or osteotomes for such orthopedic procedures. Instruments that are recommended to be sharpened by the manufacturer should be processed and verified by the manufacturer's specific instruction. Instruments should be used only for their identified purpose. Careful planning is necessary for selection of the proper amount and type of instruments needed for each surgical procedure.

4.2 Care During Use:

4.2.1 Handle instruments gently.

4.2.2 Avoid dropping instruments or covering them with heavier instruments.

4.2.3 Handle instruments individually or in small numbers.

4.2.4 Protect instrument tips, especially sharp ones. Do not place instruments down on their tips.

4.2.5 Do not drop delicate or sharp instruments into any cleaning receptacle. Such practice may cause damage to the instruments.

4.2.6 After a surgical procedure, an instrument count should be made to avoid sending any instruments to the laundry with the soiled linen. Although they eventually may be returned, they create an injury hazard to laundry workers and many are damaged beyond economical repair.

4.3 *Marking*—Do not use a vibrating or impact-type marking device on the box lock portion. If marking is necessary, do it on the shanks, otherwise the box locks may fail.

5. Cleaning

5.1 *General*—Clean instruments as soon as possible after use. Do not allow blood and debris to dry on the instruments. If cleaning must be delayed, place groups of instruments in a covered container with appropriate detergent or enzymatic solution to delay drying. Wash all instruments whether or not they were used or were inadvertently contacted with blood or saline solution.

After surgery, open box locks and disassemble instruments with removable parts. Forceps and scissors should be cleaned and sterilized in the open position. This will limit blood drying on the instruments which may cause them to corrode. Delicate and sharp instruments should be cleaned separately. This is especially true for eye and microsurgery instruments. (**Warning**—When handling any sharp instruments, use extreme caution to avoid injury. Consult with an infection control practitioner to develop and verify safety procedures appropriate for all levels of direct instrument contact. Direct handling and cleaning of instruments should be done only when indirect methods (for example, tweezers) are not available or not possible.) Sort instruments by similar metal for subsequent processing so that electrolytic deposition due to contact between dissimilar metals will not occur.

Prior to regular cleaning, soak in enzyme solution or rinse instruments in demineralized or distilled water to remove blood and debris, especially those instruments with hollow tubes such as suction tubes and curettes.

Do not use abrasive pads or cleansers which will scratch the surface, allowing dirt and water deposits to collect. Abrasive cleaning will remove the passive layer. Do not use chlorine bleach at a higher concentration than recommended by the manufacturer to clean or disinfect stainless steel instruments, as pitting will occur. High concentrations of chlorine-based solutions are not recommended as pitting and subsequent damage will occur. (See [Appendix X3](#).)

5.2 *Detergents*—The detergent used should be in keeping with the cleaning equipment manufacturer's recommendations. Neutral pH detergents, between 7.0 and 8.5, which are low sudsing, free rinsing, and have good wetting are best overall for washer decontaminators and ultrasonic cleaners. High-sudsing detergents must be thoroughly rinsed or instruments will spot or stain. (See [Appendix X2](#).)

5.3 *Washer Decontaminator*—Equipment of this type will wash and decontaminate instruments. Complete removal of