This guidance was written prior to the February 27, 1997 implementation of FDA's Good Guidance Practices, GGP's. It does not create or confer rights for or on any person and does not operate to bind FDA or the public. An alternative approach may be used if such approach satisfies the requirements of the applicable statute, regulations, or both. This guidance will be updated in the next revision to include the standard elements of GGP's.

LABELING REUSABLE MEDICAL DEVICES FOR REPROCESSING IN HEALTH CARE FACILITIES: FDA REVIEWER GUIDANCE

OFFICE OF DEVICE EVALUATION

APRIL 1996

Scope

This guidance provides recommendations regarding the content of reuse instructions in labeling for reusable medical devices. The recommendations are also applicable to the initial processing of single-use only and reusable devices that are supplied nonsterile, and reprocessing of certain sterile, single-use only implantable devices if they become contaminated before implantation (e.g., orthopedic implants).

The guidance is primarily directed to FDA personnel who are responsible for the evaluation of premarket notification submissions [510(k)s], premarket approval applications (PMAs), and investigational device exemptions applications (IDEs). The guidance will also assist persons preparing 510(k)s, PMAs, and IDEs for submission to FDA.

Under FDA labeling regulations, 21 CFR 801, a device must have adequate directions for use, which include instructions on preparing a device for use. Instructions on how to reprocess (i.e., clean, and disinfect or sterilize) a reusable device are important steps in preparing a device for the next patient.

This document is not intended to be an in-depth guidance on device design and testing factors related to infection control. However, it is essential that the manufacturer consider infection control requirements during product design and testing to facilitate cleaning, and sterilization or disinfection, if necessary. Design and testing factors are addressed in device-specific FDA guidance, and FDA good manufacturing practices (GMPs) guidance.

FDA staff and persons preparing submissions should also refer to the Technical Information Report (TIR) developed by the Association for the Advancement of Medical Instrumentation (AAMI) entitled Designing, Testing, and Labeling Reusable Medical Devices for Reprocessing in Health Care Facilities: A Guide for Device Manufacturers, AAMI TIR No.12-1994. The AAMI TIR provides comprehensive technical information for manufacturers, and user perspectives on this topic. This FDA reviewer guidance complements the AAMI TIR.

TABLE OF CONTENTS

A. Overview of Device Reprocessing

The following is a brief overview of how reusable medical devices are reprocessed in health care facilities. Please refer to the AAMI TIR for an expanded description of device reprocessing. Supplemental information on reprocessing of some specific devices, such as endoscopes, is available from FDA and professional associations.

Preparing reusable devices for the next patient can be challenging for health care facilities. Unlike bioburden-based manufacturing sterilization processes, the health care workers responsible for reprocessing reusable devices do not know the amount and resistance of contamination on the devices to be reprocessed. The device labeling, professional practices, and institutional infection control procedures help guide the persons who are responsible for reprocessing devices. Institutional device reprocessing should occur in facilities that are adequately designed, equipped, monitored, and staffed by trained personnel.

Principles of infection control require that all contaminated devices be correctly and safely handled by health care personnel, and that the reusable devices be adequately reprocessed. Proper handling and reprocessing of reusable devices for the next patient requires several steps. Diligent execution of all steps is extremely important. The general reprocessing steps are as follows:

1. Reprocessing begins at the point of use. Contaminated reusable devices are segregated from waste. Any protective covers that were used to minimize device contamination are discarded. Contaminated devices may be wiped clean of visible soil at the point of use. The reusable devices that require reprocessing at a decontamination and sterilization work area are then properly contained.

2. Contained, soiled devices are transported to a decontamination and sterilization work area.

3. The devices are decontaminated. Decontamination is a process that is intended only to render the device safe for handling by health care workers. A decontaminated device may not necessarily be suitable for patient use.

    a. The soiled devices are disassembled, when possible, to facilitate the decontamination process of cleaning and, if necessary, disinfection or sterilization.

    b. The devices are thoroughly cleaned with a compatible detergent then rinsed to remove residues. Other accessories and procedures, such as enzyme cleaners and

ultrasound baths, may also be used to remove organic matter from the devices. Careful cleaning is crucial since it not only can remove most contamination, it helps ensure the effectiveness of any subsequent microbicidal process. As a rule, a reusable device should be designed so that it can be adequately cleaned. If a device cannot be adequately cleaned, any subsequent disinfection or sterilization process may not achieve the desired result.

c. After the reusable devices are cleaned, they may require additional microbicidal steps, including either a disinfection or sterilization process, to render them safe for handling. For example, extra microbicidal steps may be appropriate for devices that institutions assume are contaminated with a virulent pathogen, e.g., Mycobacterium tuberculosis.

4. Devices that have been decontaminated are then segregated into those devices that may be returned directly to service, as is, and those that still require a terminal microbicidal process, e.g., sterilization.

5. If required, a terminal process is completed. Devices are returned to service.

B. Responsibilities Regarding Reusable Medical Device Labeling

FDA agrees with the AAMI Reuse TIR that the responsibility for safe and effective reprocessing of medical devices rests with BOTH the manufacturer of the reusable medical device and the user of the device. Manufacturers of reusable medical devices are responsible for supporting the claim of reuse with adequate labeling. The labeling must provide sufficient instructions on how to prepare the device for the next patient. The manufacturer is also responsible for documentation of tests which show that the instructions are adequate and can be reasonably executed by the user. The users are responsible for ensuring that they have the facilities and equipment to execute the instructions, and that the instructions are followed.

C. Criteria for Reprocessing Instructions

Introduction

This part describes SEVEN CRITERIA for evaluation by the FDA reviewer. If the labeling is deficient based on any relevant criterion, then the FDA reviewer should inform the applicant of the deficiency. The applicant must submit either correct labeling, or an adequate justification, with supporting documentation, why they believe the labeling is adequate, in a manner consistent with Office of Device Evaluation Blue Book policy on communication with industry. The seven criteria are reduced to a reviewer checklist in Part G on page 14.

The applicant must provide reasonable grounds for omission of reprocessing information (per 21 CFR 801.109(c)) for prescription devices. One example is that there are "commonly understood" infection control practices for solid, single piece stainless steel surgical instruments. Cleaning and steam sterilization of these devices is relatively standard practice. The ODE reviewer should carefully evaluate any request for an omission along with the supporting documentation. If FDA accepts the omission, the reviewer should inform the applicant that the ability to reprocess the device according to the established, common practices must still be qualified and documented by the applicant.

Note that labeling of several marketed reusable devices direct the user to reprocess the device according to "hospital procedures." Unless the reusable device meets the criteria for labeling omission noted above, this labeling statement alone is unacceptable because sufficient standard procedures do not exist for many devices.

Additional Factors to Consider

Since this guidance is not specific to any particular device, the ODE reviewer should rely upon the following factors, in addition to the seven criteria detailed beginning on the next page, to determine whether the labeling is adequate:

1. device specific FDA guidance,

2. applicable regulations, such as the labeling exemption for surgical instruments under 21 CFR 801.109(b) or device specific labeling requirements in Part 801, Subpart H,

3. labeling for other similar legally marketed devices (see Section D for limitations),

4. consistency across a product line,

5. the reviewer's experience in the product area,

6. infection control problems associated with the device noted in the FDA device problem reporting system, the literature, FDA safety alerts, etc.,

7. consultation with knowledgeable, authorized people, such as FDA staff, special government employees, and other government experts,

8. specific patient and user risks posed by the device, and

9. relevant professional, government, and industry infection control guidance, guidelines and standards.

The Seven Criteria

1. In general, **labeling for a reusable device that contacts the patient in some manner must include reprocessing instructions.** Care instructions for devices that do not typically contact patients are recommended.

   AND

   The labeling for a patient contact device sold nonsterile, whether or not it is reusable, must include initial instructions on how to make the device patient ready.

2. All reprocessing instructions should include **a statement that the device must be thoroughly cleaned.**

   Thorough cleaning is only the first step required for effective reprocessing, but it may be all that is necessary, depending on the intended use of the device. The details of the cleaning procedure may vary depending on the complexity of the device.

   Device labeling may include directions regarding the use of protective covers to minimize the extent of cleaning and further reprocessing needed before device reuse. All protective covers have not been evaluated by FDA according to consistent criteria. As a result, the utility of protective covers may vary from product to product. When protective covers are mentioned in labeling for reusable devices, the labeling should refer to protective covers with claimed liquid and microbial barrier properties. In turn, these claims, and other important factors, must be validated by the protective cover manufacturer and assessed under the 510(k) process for the protective covers.

   The cleaning step may be included in labeling as part of a

decontamination regimen. Since decontamination addresses user safety and not necessarily patient safety it is important for the manufacturer to evaluate the rigor of the cleaning process in terms of how adequate the process will be in eliminating visible soil from the device to make the device patient ready, thus making any required terminal process more effective.

3. **The instructions must indicate the appropriate microbicidal process for the device.**

   The labeling should indicate either:

   STERILIZATION

   OR

   HIGH, INTERMEDIATE, OR LOW LEVEL DISINFECTION

   Refer to the Processing Triage in Appendices 1 and 2 for assistance in determining the appropriate microbicidal process. The reprocessing instruction in the labeling must be consistent with the standard of care expressed by government agencies and relevant professional organizations. For example, FDA currently expects that labeling for flexible endoscopes used in the GI and respiratory tracts will provide both sterilization and high level disinfection procedures.

   FDA will not accept less than the minimum acceptable level of reprocessing, as described in Appendices 1 and 2. The reviewer should refer any deviations to division staff with infection control experience or to the Chief, Infection Control Devices Branch, Division of Dental, Infection Control, and General Hospital Use Devices for a consultation.

4. **The process must be feasible considering the intended location of reprocessing (e.g., health care facility or home use).**

   Persons reprocessing reusable devices must have the ability to carry out the reprocessing steps. Some types of sterilizers, such as radiation sterilization, are used only in manufacturing facilities. Steam sterilization is the most common method of sterilization used in health care facilities. Chemical vapor, ethylene oxide, gas/plasma and liquid chemical sterilizers are also found in many facilities. Dry heat sterilizers are less common in some environments.

   Some simple reprocessing of devices takes place in the

home, either by trained personnel or lay persons. For example, some medical equipment used commonly in the home setting can be cleaned, surface disinfected, if needed, and serviced on site. Also, reusable contact lenses, which are common devices, are cleaned, disinfected, and rinsed by users.

5. **The instructions must be understandable.**

Instructions must be clear, grammatically correct, legible, and in logical order from the initial processing step through to the terminal processing step (e.g., preprocessing, cleaning, rinsing, disinfection or sterilization, final rinsing after disinfection or liquid chemical sterilization, and post-process handling).

6. **The instructions must be comprehensive.**

Comprehensive instructions enable the person responsible for reprocessing the device to understand precisely how to execute the reprocessing regimen safely and effectively. There may be several acceptable formats for instructions. The ODE reviewer should concentrate on the sequence of steps and content of each step. Instruction must at least be in English. Inclusion of duplicate instructions in other languages are solely at the discretion of the manufacturer.

The elements of comprehensive reprocessing instructions are listed below. Comments related to the qualification of specific elements are noted in brackets []. The ODE reviewer must use judgement to determine if an element applies to the device under review.

a. Special Accessories: The instructions should describe any special cleaning, and sterilization or disinfection accessories that are required or recommended (e.g., special tools, trays, test kits, specific types of sterilization wraps or containers, protective covers, etc.).

b. Special Pre-processing Handling: Special preprocessing handling requirements should be described, as needed (e.g., for items contaminated with protein material, prevention of drying prior to cleaning will facilitate cleaning).

c. Disassembly/Reassembly: If the device consists of more than one removable part, then disassembly/reassembly instructions must be included.

d. Method of Cleaning: The labeling should recommend a method of cleaning. The method listed may be manual or mechanical (e.g., washer, washer/disinfector, ultrasonic washer, etc.).

[The cleaning qualification should determine the parameters for cleaning, and the labeling should describe the requirements (e.g., water quality, time-at-temperature, etc.). If a cleaning method is not specified, then the manufacturer must qualify a representative sample of commonly used methods of cleaning.]

e. Cleaning/Lubricating Agents: The instructions should recommend compatible cleaning and lubricating agents or a class of agents (e.g., anionic detergents, detergent/disinfectants, enzymatic detergents, water soluble lubricants, etc.). The labeling for the reusable device should refer to the cleaning and lubricating agent labeling for preparation and use instructions of those agents.

[If a specific agent or class of agents is not identified, then the cleaning qualification should include a representative sample of commonly used products.

Qualification tests may determine that additional instructions are needed when using cleaning and lubricating agents. If the additional instructions significantly impact the intended use or conditions of use of the cleaning/lubricating agents (e.g., change in process time, temperature, material compatibility, etc.), then the manufacturer must qualify the safety and effectiveness of the agents under the modified conditions of use.]

f. Rinsing: Specific directions for adequate rinsing after cleaning and any liquid chemical disinfection or sterilization, should be recommended including the type and quality of rinse water, volume, and duration of rinse. Rinsing may be manual or mechanical. If the rinsing instructions in the cleaning and disinfecting/sterilizing product's labeling are sufficient then reusable device labeling may refer to those instructions.

[Rinsing instructions must be qualified to show that residual cleaning agents are removed to a level that will not interfere with subsequent reprocessing steps, and liquid chemical germicides

are removed to a level that is nontoxic.]

g. Method of Disinfection or Sterilization: When applicable, labeling should specify at least one qualified method for disinfection or sterilization including specific parameters (e.g., cycle parameters, aeration, if applicable, specific liquid chemical germicide, orientation or positioning of the device in the sterilizer, etc.). If the labeling lists a generic type of sterilization or disinfection process, e.g., "steam sterilization," with no specifics on cycle parameters, then the applicant must qualify all forms of the listed generic method.

[Care must be exercised by manufacturers of reusable devices to ensure that sterilization processes listed in labeling are safe and effective for their specific device. Microbicidal processes are not interchangeable. Each type of process has its advantages and limitations. For example, heat labile devices must be sterilized by a non-thermal process, e.g., vapor, gas/plasma, or liquid chemical sterilant. A device may require a particular mode of steam sterilization. Some methods are complex (e.g., EtO) and specific directions are essential.]

h. Special Post-process Handling: Special post-processing procedures should be recommended, as needed, in order to eliminate or minimize recontamination before reuse. A recommended post-process aeration time must be provided if labeling recommends EtO sterilization.

i. Reuse Life: The labeling should tell the user, based upon testing, how many times the product can be reused, or provide a mechanism to ascertain that the device is still within specifications. For example, the labeling for reusable devices (1) state the maximum number of reuses and provide a tracking method, e.g., the fabric grid provided for reusable surgical gowns, (2) identify a performance test that must be passed prior to reuse, or have an automatic precheck function, or (3) describe unacceptable deterioration, such as corrosion, discoloration, etc..

j. Special Warnings and Precautions: Special warnings or precautions regarding the reprocessing procedure should be described, when warranted. These may relate to user safety, or emphasize conditions that may significantly impact upon the effectiveness of reprocessing or the performance

of the device.

k. Lay Use: Devices that are intended to be maintained by a patient or lay health care provider must have reprocessing instructions which are understandable to a lay person, and which can be done at home. The ODE reviewer should direct the manufacturer to the Division of Small Manufacturers Assistance for FDA guidance on home use labeling if there are deficiencies.

l. Reference to Guidance Documents or to Labeling of Accessory Devices: The device labeling may refer to professional practices/guidance or to labeling of accessory devices used in reprocessing (e.g., washers, washer/disinfectors, automated endoscope reprocessors).

For example, reference to guidance by the Association of Operating Room Nurses, The Centers for Disease Control and Prevention, the Association for Practitioners in Infection Control, Inc., etc., may substitute for reiteration of equivalent directions. The manufacturer must still validate the instructions regardless of the source of the instructions.

Reference to labeling of other devices used in reprocessing is acceptable provided labeling statements are consistent and complement one another. For instance, labeling for an endoscope may refer, in part, to endoscope washer labeling for certain details on scope reprocessing (e.g., placement in chamber).

m. Telephone Number to Request Information: The instructions should include a telephone number to obtain additional information on the device, including questions on infection control procedures.

n. Statement on the Need for the User to Qualify Deviations from the Recommended Method: The labeling may advise that it is the users' responsibility to qualify any deviations from the recommended method of processing, and may state appropriate disclaimers if there are deviations.

7. **The instructions must include only devices and accessories that are legally marketed.**

Many products used in reprocessing reusable devices are currently subject to FDA premarket clearance. These include

all sterilizers used in health care facilities, as well as liquid chemical sterilants and disinfectants intended for use on medical devices. General lubricants, presoaks, enzyme cleaners, and detergents and glassware washers are exempt from premarket clearance as general purpose articles.

Within 45 days of the release of this document the Infection Control Devices Branch will establish and maintain a LAN file which will list the legally marketed liquid chemical sterilants and high level disinfectants, until further notice. Numerous intermediate and low level disinfectants have been cleared.

D. Predicate Device Labeling

When evaluating a 510(k) the ODE reviewer compares the labeling for the claimed legally marketed equivalent device to the labeling for the new device. The reviewer identifies differences and assesses the impact of the differences on equivalence. Reprocessing instructions for some legally marketed reusable devices may not be consistent with state-of-the-art infection control procedures, therefore, the reviewer cannot necessarily rely on the predicate labeling as a model for the new device in regard to infection control instructions. In the interest of public health, reprocessing instructions for the new device must be consistent with state-of-the-art infection control procedures.

If an ODE reviewer, in agreement with their management, finds that the 510(k) applicant is relying on predicate labeling that could be a public health concern in regard to infection control issues then he/she should 1) recommend that the applicant update the labeling of the new device in accordance with this guidance; and 2) send a memo to the Director, Office of Compliance (OC) through channels, informing OC of the deficient instructions for the predicate device. If the applicant does not agree with the recommended update in labeling the burden is on the applicant to justify, with supporting documentation, why they believe the labeling is consistent with state-of-the-art infection control practices.

E. Documentation of Validation of Reprocessing Instructions

The 510(k), PMA, or IDE must include the following documentation on the validation of the reprocessing instructions:

1. **A 510(k) must include a statement on the status of the validation.**
   A statement should be included in the 510(k) that is signed by the applicant, their agent, or other legally responsible individual attesting to the status of the validation. Two

examples of statements are provided below.

Statement 1 may be submitted for a completed validation, where the labeling in the 510(k) is based upon the results of the qualification tests.

Statement 2 is ONLY for the following situations: (1) the validation has not been completed, and there is either a device specific industry standard, specific regulatory guidance document, or a relevant standard on validation of the reprocessing instructions that the applicant will meet (see Option 1); OR (2) the manufacturer believes that the device is virtually identical, from an infection control perspective, to other devices for which the manufacturer has previously validated the reprocessing instructions, and the prior validation has been subject to GMP inspection (see Option 2).

STATEMENT 1, VALIDATION COMPLETED:
"The instructions for reprocessing the device have been validated according to [describe the published method or standard that is the basis for the validation]. I have enclosed a summary of the method of validation [when the basis is other than a published method or standard]. The complete validation is on record at [location] and available for inspection, and it will be supplied to FDA upon request. The validation includes protocols, specifications, pass/fail criteria, results, and procedures which describe when the instructions must be requalified (e.g., if the device is modified)."

OR

STATEMENT 2, OPTION 1, VALIDATION NOT COMPLETED:
"The instructions for reprocessing the device will be validated before the device is marketed according to [describe the published method or standard that is the basis for the validation]. I have enclosed a summary of the method [when the basis is other than a published method or standard]. The validation of the reprocessing instructions and the final labeling will be on record at [location] and available for inspection, and it will be supplied to FDA upon request. The validation will include protocols, specifications, pass/fail criteria, results, and procedures describing when the instructions must be requalified (e.g., if the device is modified)."

STATEMENT 2, OPTION 2, VALIDATION NOT COMPLETED:

"This device is virtually identical from an infection control perspective to the [name of predicate device(s)] for which we have previously validated the reprocessing instructions. The validation has been subject to GMP inspection."

The statements submitted do not have to be verbatim, i.e., there may be minor variations.

ODE reviewers will NOT request or review the qualification tests conducted as part of the validation for 510(k) submissions unless requested by the Office of Compliance, as directed by management on a case by case basis, or as recommended in device specific guidance. Evaluation of the validation process is primarily the responsibility of OC and the field staff.

ODE reviewers have latitude to evaluate what is submitted, e.g., to determine whether the basis for the validation is relevant, or whether the summary raises serious concerns. There is a contraint to the evaluation of the summaries. There is a paucity of published specific methods or standards on validation of reprocessing instructions. FDA recommends that the AAMI TIR and FDA guidance on process validation be used as a set of principles regarding methodology from which specific protocols may be developed (see Appendix 3). Until specific methods or standards are published, reviewers are advised to use flexibility in evaluating the summaries, e.g., evaluate the fundamental methodology and principles of the tests described rather than the specifics.

Despite general notices ragarding the availability of this guidance, many applicants will not be aware of FDA's initiative in regard to labeling of reusable devices, so there will be deficiencies. Early communication over the phone with the applicant will resolve most deficiencies. Lack of a statement of status of the validation is a deficiency that can be included in an "unable to determine SE" letter. Lack of a statement on validation can also be a basis for a not substantially equivalent (NSE) determination, i.e., acceptable equivalent performance has not been demonstrated.

2. **A PMA must include a complete report of the qualification of the reprocessing instructions in the manufacturing and control section.**

The reprocessing validation will be reviewed in the same manner as the other manufacturing and control data according to Blue Book policy.

3. **An IDE should include a summary of the qualification of the reprocessing instructions, when completed, or the protocol for qualification.**

   The reviewer should use judgement when considering the extent of the data needed to document the safety of the device. Consider conditions of approval to resolve deficiencies as the default decision unless there are critical safety concerns related to infection control.

F. Person To Contact With Questions Regarding This Guidance

Any general questions regarding this guidance should be directed, in writing, to Chief, Infection Control Devices Branch, Division of Dental, Infection Control, and General Hospital Use Devices, Office of Device Evaluation, HFZ-480, 9200 Corporate Blvd., Rockville, MD 20850, or by calling (301) 443-8897.

G. Reviewer Checklist for Reprocessing Instructions

The checklist is a summary of Section C of the guidance.

#	QUESTION	Y/N
1.	Is the device (1) reusable, (2) supplied nonsterile, or (3) supplied sterile? Does the labeling commonly include reprocessing instructions? If YES to any, continue review of instructions. If NO to all, processing instructions are not needed.	
2.	Does labeling include (re)processing instructions? If YES, continue review of instructions. If NO, is there adequate justification for omission? If NO, STOP review of reuse instructions. Labeling is deficient.	
3.	Is there an instruction for cleaning (see page 4)?	
4.	Is correct microbicidal process indicated (see page 5 and Appendices 1 and 2)?	
5.	Is the process validated (see statement and information, part E)?	
6.	Is the process feasible (see page 5)?	
7.	Is the process understandable (see page 6)?	
8.	Is the process comprehensive (see pages 6-9)? • special accessories • special pre-processing handling • disassembly/reassembly • cleaning methods • cleaning/lubricating agents • rinsing • method of disinfection or sterilization • special post-process handling • reuse life • special warnings/precautions • lay use • reference to guidance documents or accessory labeling • telephone number • user qualification of deviations	
9.	Are the recommended accessories legally marketed?	

Appendix 1
Reprocessing Triage

Critical Device[1]: a medical device that is intended to enter a normally sterile environment, sterile tissue or the vasculature. A critical device poses a high risk of infection if it is contaminated with any microorganisms. A critical device must be thoroughly cleaned and sterilized before reuse. Examples of reusable critical devices include surgical instruments, rigid endoscopes, and needles.

Semicritical Device: a medical device that is intended to come in contact with mucous membranes or minor skin breaches. Mucous membranes are generally resistant to infection by moderate levels of most bacteria but may be susceptible to certain pathogens. Compromised skin presents an opportunity for infection but a sterile device is not absolutely required for a minor breach. If a semicritical device poses a high risk, or is known to be contaminated by high grade, fomite transmissible pathogens, additional processing is necessary. A semicritical device must be thoroughly cleaned and subjected to a germicidal process with a broad spectrum of activity. Sterilization is desirable, but high level disinfection is acceptable if sterilization is not practicable. Examples of semicritical reusable devices include gastrointestinal (GI) endoscopes (trans-oral and trans-rectal), and urological (GU) endoscopes (trans-urethral).

Noncritical Patient Contact Device: a medical device that comes in contact with intact skin. The risk of infection is low. The device must be thoroughly cleaned. If there is a concern regarding cross-transmission of pathogens then an intermediate level disinfectant should be used, otherwise treatment with a low level disinfectant, or in some cases thorough cleaning alone, is acceptable. Examples of these reusable devices include blood pressure cuffs, stethoscopes, and skin electrodes.

Medical Equipment: a device, or a component of a device, that does not typically come in direct contact with the patient. It may serve as a vector for cross-contamination. The same level of care is exercised as for the noncritical devices. Examples include lights, stands, and examination tables.

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[1] The term 'Critical Device' is also defined under 21 Code of Federal Regulations, Part 820, Good Manufacturing Practices for Medical Devices. The definition and its usage under GMPs is not the same as that presented above. Recognizing the potential for confusion, this document still maintains use of the term 'critical device' in order to be consistent with terminology in infection control guidance produced by the Centers for Disease Control and publications by infection control practitioners and associations.

Appendix 2
Correlation of Triage to Microbicidal Process

Category	Process
Critical	Sterilization
Semicritical	Sterilization desirable High Level Disinfection is acceptable in most cases
Noncritical	From Intermediate Level Disinfection to Cleaning depending upon patient contact, type and amount of contamination
Equipment	Same as noncritical

Note: Some allowance is stated between the type of process that is desirable and that which is minimally acceptable for semicritical and noncritical devices. This margin of tolerance is consistent with direction from CDC and infection control practitioners.[1]

All critical reusable devices must be sterilized without exception. Reusable semicritical devices should likewise be sterilized but in some cases this will not be practicable. For example, the device materials may not withstand sterilization processes, or clinical circumstances may dictate the method of choice.

Appendix 3
Summary of Validation of Reprocessing Instructions

1. Introduction

It is likely that revised GMPs will require that the manufacturer validate the design of their reusable device and the reprocessing procedures to make certain the device can be adequately reprocessed over its use life. An industry standard for validating design and processing instructions is not available. The AAMI Technical Information Report on Reprocessing of Reusable Devices provides guidance on this matter.

There is ample additional information on sterilization validation that can be directly applied to reprocessing validation. The manufacturer may refer to the FDA Sterile Medical Devices Workshop Manual, USP XXIII, other AAMI sterilization validation standards, and the literature for assistance in developing their protocols. Available FDA guidance also discusses reconditioning (cleaning and resterilizing) of returned devices.

2. Definition of Reprocessing Instructions Validation

A documented program which provides a high degree of assurance that a specific reprocessing procedure will consistently produce a device that meets predetermined specifications.

3. The Basics of Reprocessing Validation

There are several steps to a complete validation as follows:

a. Pre-qualification

Defining Product Specifications:
- Design
- Materials
- Operating Requirements

Defining Processing Specifications:
- Cleaning and Germicidal Agents
- Precleaning and Rinsing
- Packaging
- Processing Equipment
- Microbicidal Process
- Post-processing

b. Qualification of Specified Processing Equipment to be Recommended in Labeling

c. Performance Qualifications of (1) the Cleaning/Rinsing Steps, and (2) the Sterilization or Disinfection and Final Rinsing Steps
    - Processing Equipment Evaluation
    - Microbiological Challenge
    - Product Functionality Evaluation (repeated studies for reuse)
    - Residue Evaluation

d. Documentation
    - Documentation
    - QC Review and Approval

e. Re-qualification

4. Simulated and Actual Use Studies

The performance qualifications require, at a minimum, simulated testing of reprocessing of the device. The rationale for use of only simulations should be documented by the applicant and held for inspection. The simulated use test conditions should mimic the worst-case actual use conditions (e.g., extremes of contamination and reprocessing conditions over the reuse life of the product). If the applicant cannot adequately simulate actual use conditions, then the applicant should subject the device to actual use, i.e., clinical, tests to confirm the validity of the procedures.

Appendix 4
Definition of Terms

The following are common microbiological terms that a reviewer may encounter in evaluating reprocessing instructions in device labeling culled from referenced literature.[2,3,4,5] The list is not exhaustive. The terms marked with an asterisk are used in this document. Additional definitions of terms can be found in the referenced literature.

1. Antiseptic: A substance that prevents or arrests the growth or action of microorganisms on living tissue either by inhibiting their activity or destroying them. Antiseptics are regulated as drugs.

2. Bioburden: The number and types of viable microorganisms which contaminate an article; also known as "bioload" or "microbial load". When measured, bioburden is expressed as the total count of bacterial and fungal colony-forming units per single item.

3. Bioburden Based Sterilization: A sterilization process based on known levels of microbial contamination on all surfaces to be sterilized.

4.* Biological Indicator (BI): A sterilization process monitoring device consisting of a standardized, viable population of microorganisms (usually bacterial spores) known to have high resistance to the mode of sterilization being monitored.

5. Chemical Indicator: A sterilization monitoring device designed to respond with a characteristic chemical or physical change to one or more of the physical conditions within the sterilizing chamber.

6.* Cleaning: The removal of adherent visible soil (e.g., blood, protein substances, and other debris) from medical devices by a manual or mechanical process, as part of a decontamination process.

7. Death Rate Curve (or Survivor Curve): A graphic representation of the microbial death rate kinetics of a specific microbicidal agent on a defined microbial population.

8.* Decontamination: According to the United Stated Occupational Safety and Health Administration (OSHA), "the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting

infectious particles and the surface or item is rendered safe for handling, use, or disposal" [29CFR1910.1030]

Note - In common usage, "decontamination" generally refers to all pathogens (microorganisms capable of producing disease or infection), not just those transmitted by human blood.

9.* Disinfectant: An agent that disinfects.

10.* Disinfection: A process that destroys pathogens and other microorganisms by physical or chemical means. Disinfection processes do not ensure the same margin of safety associated with sterilization processes. The lethality of the disinfection process may vary, depending on the nature of the disinfectant, which leads to the following subcategories:

a. High Level Disinfection: A lethal process utilizing a sterilant under less than sterilizing conditions. The process kills all forms of microbial life except for large numbers of bacterial spores.

b. Intermediate Level Disinfection: A lethal process utilizing an agent that kills viruses, mycobacteria, fungi and vegetative bacteria, but no bacterial spores.

c. Low Level Disinfection: A lethal process utilizing an agent that kills vegetative forms of bacteria, some fungi, and lipid viruses.

11.* Fomite: An inanimate object or material on which disease producing agents may be conveyed.

12.* Germicide: An agent that destroys microorganisms, particularly pathogenic organisms. Other terms with the suffix -cide (e.g., virucide, fungicide, bactericide, sporicide, tuberculocide) destroy the microorganism identified by the prefix.

13. Microbicidal Kinetics: The mathematical relationship between a condition of exposure of a known microbicidal agent to the number of specified microorganisms killed.

14. Organic and Inorganic Load: Ambient or applied inorganic (e.g. metal salts) or organic (e.g., proteins) contaminants on the surface of a medical device prior to reprocessing. The naturally occurring organic load is also known as bioburden.

15. Overkill Sterilization: A sterilization process that is

based on an arbitrarily established higher initial concentration and resistance of bioburden than that actually expected on the medical devices to be sterilized. Overkill processes typically are based upon a 10^4-10^6 colony forming unit (CFU) population of bacterial spores known to be resistant to the sterilization process.

16.* Performance Qualification: An element of the sterilization validation program consisting of selected engineering and microbiological demonstrations performed according to a predefined protocol to show process reproducibility and product acceptability.

17.* Process Residue: The substance remaining on the surface of a medical device after exposure to a decontamination or terminal process.

18. Qualification: The documented procedure of a test protocol to show compliance to an established standard or specification.

19.* Reusable Medical Device: A device intended for repeated use either on the same or different patients, with appropriate decontamination and other reprocessing between uses.

20. Sanitizer: An agent that reduces the number of bacterial contaminants to safe levels as judged by public health requirements.

21.* Spore: The dormant state of a microorganism, typically a bacterium or fungus, which exhibits a lack of biosynthetic activity and reduced respiratory activity.

22.* Sterilant: Physical or chemical agent(s) which causes sterilization.

23.* Sterile: The absolute state where all forms of life have been eliminated. In a practical sense absolute sterility cannot be proven, therefore, sterility is considered achieved when organisms are eliminated, inactivated, or destroyed such that they are undetectable in standard media in which they have previously been found to proliferate.

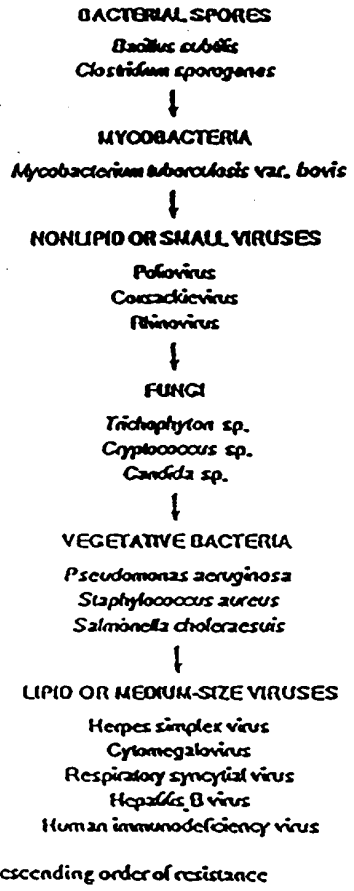
24. Sterility Assurance Level: A value indicating the probability of a microbial survivor after a sterilization process.

25.* Sterilization: An act or process which completely eliminates or destroys all forms of life, particularly microorganisms.

26.* Validation: A documented program which provides a high degree of assurance that a specific process will consistently produce a product that meets its predetermined specifications and quality attributes.

27. Vegetative: An active growth phase of a microorganism.

Appendix S (reproduced with permission)
Resistance to Germicidal Chemicals[1]



Disinfectant Activity According to Type of Microorganism[1]

Levels of disinfectant action according to type of microorganism

Disinfectant level	Killing effect[a]					
	Bacteria			Fungi[d]	Virus	
	Spores	Tubercle bacillus	Vegetative cells		Nonlipid and small	Lipid and medium size
High	+[c]	+	+	+	+	+
Intermediate	−[f]	+	+	+	±[g]	+
Low	−	−	+	±	±	+

[a] +, Killing effect can be expected; −, little or no killing effect.
[b] Includes asexual spores but not necessarily chlamydospores or sexual spores.
[c] Only with extended exposure times are high-level disinfectants capable of killing high numbers of bacterial spores in laboratory tests; they are, however, capable of sporicidal activity.
[d] Some intermediate-level disinfectants (e.g., hypochlorites) may exhibit some sporicidal activity, whereas others (e.g., alcohols or phenolic compounds) have no demonstrated sporicidal activity.
[e] Some intermediate-level disinfectants, although tuberculocidal, may have limited virucidal activity.

Appendix 6
COMPARISON OF TERMINOLOGY FDA/CDC/EPA

CDC and FDA use similar terminology pertaining to chemical sterilants and disinfectants. EPA defines these products differently. For information purposes the correlation of terms is as follows:

DEVICE RISK CATEGORY	CDC/FDA GERMICIDE TERM	EPA GERMICIDE TERM
Critical Device	Sterilant	
		Sterilant
Semicritical Device	High Level Disinfectant	
Noncritical Device	Intermediate Level Disinfectant	Hospital Disinfectant (with TB claim)
	Low Level Disinfectant	Hospital Disinfectant
		Sanitizer

Appendix 7
FDA Status of Microbicidal Processes

1. Sterilization

There are many legally marketed sterilizers. Steam, dry heat, ethylene oxide (EtO), and boiling water sterilizers are classified in the Code of Federal Regulations. Ultraviolet light sterilization is classified for water purification. Other types of legally marketed sterilizers have been found substantially equivalent to the above classified devices.

2. Disinfection

Disinfection is typically achieved by the use of liquid chemical germicides. There are a growing number of legally marketed sterilants and high level disinfectants. There are numerous legally marketed intermediate and low level disinfectants.

Appendix 8
References

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